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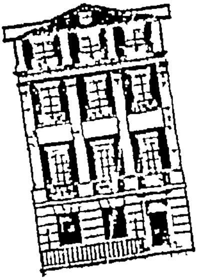

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ORIGINAL ARTICLES

APPROACH TO SPECIALISM*

SIR ERNEST FINCH
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ICAL education has interested the community since the beginning of recorded history In Babylonia 0 B.C the sick man was exhibited in the market so that the passers-by could confer with him and him as to the most appropriate treatment tus in his travels took note of medical education in and we learn from Plato and Martial that in and Rome there was an apprenticeship system dition to the apprenticeship a period of travel man) was encouraged and to have visited and in Alexandria was a great recommendation for ung physician

modern conception of medical education shows returning to this older pattern and the training specialist today is almost a re-establishment of uild system of apprenticeship, journeyman and ance as a master in the guild fraternity

HISTORICAL BACKGROUND

College of Surgeons, as we know it dates from In 1802 the conditions for membership (M R.C.S) that the candidate:

be 22 years of age;
have served an apprenticeship to a member of the e for 5 years;
have been approved by a court of examiners

is no mention in the by laws of any compulsory es or teaching At the final examination which el in an oral examination only there was no ical test and 40 candidates might be examined evening

1815 the Apothecaries Act was passed, and one first regulations was that fifteen months attend at a dispensary will be considered evidence that the date for licence has passed through a sufficient of practical medicine' This led the hospitals ndon and elsewhere to open outpatient departments. son had of course already founded the General ensary in Aldersgate Street where the poor could ken as outpatients diagnosed and treated by men onsultant status. He realised how much teaching be done in these outpatient departments though not live to see it for he died the year the Act was ed

that time there were no schools of medicine outside don, Oxford and Cambridge but by 1834 there were schools and in 1837 the provincial medical ols were given the right to provide all necessary cal education. In 1843 a new charter was given e Royal College of Surgeons and the name changed Royal College of Surgeons of London to of Royal College of Surgeons Fellows of the Royal College land ; and the order of was instituted Surgeons of England

n 1859 the Royal College of Physicians altered their ulations so that the licentiate (L.R.C.P) was not the loma implying specialist status; but the Conjoint loma, M.R.C.S., L.R.C.P., was not instituted till 1884 o diplomas usually taken before that time were A and M.R.C.S

THE SINGLE PORTAL

From 1860 to 1875 a great effort was made to procure England and Wales a single portal of entry into the ical profession The Royal College of Physicians Royal College of Surgeons the Society of Apothecaries, and the University of London consulted together but the deliberations broke down and the name 'Conjoint' is all that remains. THE LANCET commented as follows

'Past experience has too clearly shown that no definite unselfish plan can be expected from those who are determined never to forsake their tradition nor to abandon their vested interests. A little more wrangling, a little more [illegible] and we may hope that the Government—who will look only to the improvement of medical education and the advancement of medical art and science not the dignity or even the existence of the old colleges and corporations—will undertake the formation of a Conjoint Examination [illegible] the one portal into the ranks of the medical profession on a wide and liberal basis (*Lancet* 1875)

No serious attempt has since been made to revive this scheme but it might be worth while to reconsider it again

In 1908 the Royal College of Physicians and the Royal College of Surgeons appointed delegates to consider a draft scheme to be submitted to the University of London to establish a system of joint examination between the colleges and the university The report of the committee which was approved by both colleges proposed that the university should continue to grant degrees, but they should be what might be called honours degrees, and it should agree on a pass (qualifying) examination in association with the Royal Colleges On the other hand the Royal Colleges should continue to grant diplomas to those ineligible for university degrees and those who came from other universities But agreement was not reached

The position was further complicated when the Medical Act of 1858 called into being the General Council of Medical Education and Registration of the United Kingdom with the duty of considering The course of study and examination to be gone through in order to obtain the diploma of doctor licentiate &c and of securing the maintenance of a sufficient standard of proficiency, Under the Act of 1886 the council is authorized to employ and pay inspectors whose duties by statute are limited to inspection and report The Acts do not confer on the council the power of prescribing the curriculum beyond the general power approving the sufficiency of the course of education and examination

The licensing bodies for whose standards the G.M.C. is responsible are of two kinds:

(1) Those who admit to their examinations students from any recognised medical school who satisfy certain prescribed condition These include all the Royal Colleges the Royal Faculty the Society of Apothecaries and the University of London which admits external students.

(2) The universities other than London, which admit to their examinations only students for whose training they are responsible

The position is anomalous A degree in faculties other than medicine does not allow the possessor to practise A degree in law for instance does not confer the right to practise as a barrister or solicitor That [illegible] logically the curriculum and standard of [illegible] tion should be controlled by the Royal Colleges and by the professional corporations

This would imply that there should be one portal of entry to the student course in medicine and one portal of exit for what might be called the [illegible] to accept patients. The State would recognise as fit to [illegible] of postgraduate study The State could demand periods of postgraduate study and success in these [illegible] for the general practitioner and [illegible] This would be [illegible] entitle to a merit award [illegible] and degree in [illegible] university degree the university course [illegible] the standard The possession of a university [illegible] might be compulsory in addition to special qualifications before an aspirant could enter the consultant rank.

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* From the Bradshaw lecture delivered at the Royal College of Surgeons of England on Dec 12, 1931

CONTEMPORARY PROBLEMS

e the National Health Insurance Act (1911) ient was interested in the skill and competence doctor, and did not worry overmuch about his ations Since then the State and the citizen come more and more deeply concerned with the on of the doctor There are several reasons te has now promised specialist cover, the citizen ng for postgraduate education, and the citizen and more involved in public responsibilities on l hospital boards, boards of governors, hospital ment committees, or appointments committees, he cannot discharge properly unless he has com- medical guidance The level of medical education, erefore practice, thus depends to a great extent intelligence of the ordinary citizen (Roberts

Welfare State and Social Security can be attained an ideal and efficient service for everyone is d by the State The result must be an altera the pattern of medical interests Sydenham said ine is the art of healing as well as the science of ." Today the art is epitomised in social medicine, o problems of chronic disease, old age, mental , and pædiatrics must become much more tant than they have been in the past Positive which implies not only prevention of, but rehabili- after, sickness, will have to be studied much more y

SPECIALISTS FOR ALL

much for the scope of the new service There s the question what kind of doctors are to it? the State has promised specialist services ryone The National Health Service Act states every citizen there must be available whatever al treatment he requires and in whatever form he s it, domiciliary, institutional, general, specialist, sultant" Walshe (1950) has drawn a lively picture new régime

> e citizen, from cradle to grave, and at the price of a stamp, may hope to be accompanied on his harassed through life by relays of specialists, the obstetrician, diatrician, soon of course the pubertician, and the ncian (subgroups of the species endocrinologist), other experts in school and factory, until finally he decrepit and exhausted, into the eager hands of the cian and his sequent colleague the mortician having through all stages of the unequal contest a wide of psychiatric first aid The pædiatrician passes at the age of 12 to his successor on the medical conveyor n our Welfare State When does the hour strike hich we are passed on to the geriatrician."

it does all mean is that there must be a thorough nation of the specialist services throughout the ry

TRAINING THE SPECIALIST

he past the boundary between the general practi- r and the specialist was ill defined, and many doctors ed specialist rank from general practice Today ivision is becoming more distinct, and every year in general practice makes it more difficult for a or to become a specialist On the other hand, now the financial strain of the waiting years has been , many more doctors are aspiring to specialism are they to be selected and trained?

Ministry of Health (1950) has conceived "a training er up which the trainee proceeds as far as his abilities it and which at any time an individual practitioner have to leave if he appears unlikely to benefit from er training" How are these abilities to be assessed? ill need care and the elimination must be ruthless he good of the future patient, the aspirant, and the ce otherwise the man below on the ladder will ying to bite the heels of the man above who is trying to kick out the teeth of him who is below tion may be by examination, the results of on the whole fortuitous and uncertain as a judging what a man's capabilities will be in by confidential reports, which would undoub to neopotism and would destroy initiative

Before we can plan the training of a special answer the question What is a specialist? answers have been given in the medical lately

> "A person who has obtained the higher qualifi done his term of apprenticeship and now devotes almost exclusively to his particular specialty"

But this does not make him a consultant.

> "A specialist is one who is wholly employed in of medical science, in which he has, over a numbe acquired experience and training of a scientific and nature which is not catered for in the ordinary undergraduate training"

Again this is not a consultant, but it is a be than the last

THE SURGEON'S TRAINING

As surgeons we naturally think first of w best training for our own specialty But m Heneage Ogilvie's description of what goes good surgeon has wider application

> "He must have knowledge of anatomy, physiology, surgical history, contemporary literature, a of other surgeons, wisdom, that is clinical sense judgment based upon accumulated experience, the power to build scattered observations into som ability to instruct by word of mouth and pen, a operative skill" (Ogilvie 1946)

Treatment, especially in surgery, is hazardo patient, and experience must be acquired h the expense of the patient The price can onl low by graduated responsibility This graduat bility must be the method of training, and in responsibility can then be gradually assu patients' interests depend upon the compete consultant It has been said that a surgeon onl mature when he no longer need perform for practical experience or financial reasons cynics add that some never reach this goal

The Goodenough Committee recognised t essential foundation for a comprehensive medic is properly planned and carefully conducte education," and they recommended the esta of whole time professors who would be able to the clinical teaching of their subject and h jurisdiction over associated clinical and l facilities In practice the full time chair brings of its own It often liberates the teacher bonds of private practice only to entangle hi of administration But certainly the absence vision in surgery has had the disadvantage th is interested in one-type of case (e g, dise alimentary canal and gall bladder) while an centrates on another (e g, diseases of the th and breast) Thus the student, both und and postgraduate, has little general training, fore interest, in the only logical surgery, which to the result of trauma or deformity

The treatment of deformity, congenital or is also logical surgery, but this must ofte specialists In fact the term "general s now obsolete The modern so called gener is really a specialist in abdominal surgery, and general surgeon might be equally well app thoracic surgeon The surgeon who is primarily in the surgery of trauma is the nearest app general surgeon

THE YEARS OF TRAINING

proach to specialism must begin after the pre- on year and the *two* years which are to be spent rvices. The aspirant is then 25 years of age he is accepted for the Services after his pre on year. He returns from his National Service ps less medical experience, but certainly with ature mind; and perhaps he is married with ponsibilities.

governing bodies controlling the specialties that he first hold an appointment as a house for six months, and then as a house surgeon me period. This means a financial loss, but ly will not be sufficiently experienced to take a senior house-officer until the end of his junior pointments.

the present scheme he is then expected to do s as a registrar and three or even four years as egistrar. In my view he should not be expected trar to have decided what his specialty is to be. he should take any registrar post wherever he , and in any specialty he prefers, and if possible at an undergraduate teaching hospital.

re *not* enough vacancies at these hospitals, and what there are go to their own students; so not be allowed to stay in a teaching hospital than one year. Then he should pass to a hospital where his training continues and he tely used as a pair of hands. This means that of regional hospitals who are allowed to have must be willing, eager, and committed to into teaching. It is the duty of the postgraduate the region to see that proper regular teaching e carried out by the staff and that the patho oratories are used by the registrars to the full.

COMMON ENTRANCE TO THE SPECIALTIES

t is more or less enlightened practice today ould like to add what some might consider a ard to the course. I should like to see each during his time as a registrar take a common examination to specialism. No matter which he may later choose as his, the subjects in this mination would be anatomy, physiology, and logy (antibiotics), and he should not be allowed an appointment as a senior registrar until he d this examination.

tic will say 'Do you really mean that a man ids to be a psychiatrist, geriatrician, or anes should pass the same anatomy examination an who wishes to be a surgeon, or the same y examination as the man who wishes to be a ? The answer is Yes!

ould be two papers in these subjects, one on ms which every consultant aspirant should be swer, and another paper containing many tions from which every aspirant, whatever may be, should be able to select the necessary of questions which suit his particular bent. ice of question should be allowed in pathology macology as these subjects are going to govern sis and treatment throughout his career.

face of it this may appear an absurd proposal ant has served two years in the Forces, during has forgotten his basic subjects and perhaps habit of work. That must be agreed. The period then should be extended from two years and one year might be spent in laboratories— months in a dissecting room and six months in gical or other laboratory. But the whole period should not last more than one year. his year he should be paid as a registrar. This nt would assure for teaching schools a success demonstrators. The aspirant might of course revision of basic subjects to be unnecessary for him. But whatever he decides he should not be allow to proceed to the senior registrar grade until he passed the common entrance examination. Once has passed he is ready to proceed to a senior regist appointment which must be gained in open competitio He is now 28 or 29 years of age.

One year at least and never more than two of the senior registrar's period of training should be spe at an undergraduate teaching hospital and he sh attached during the first year to the hospital rather th to a particular unit. He should be able to split up th first year into periods of say three months each, and each of these periods with different units in the hospit in any specialty—e.g., general medicine, abdominal surgery, thoracic surgery, neurosurgery, plastic surgery, otorhinolaryngology, trauma and orthopedics, dermatology, urology, &c. This would cause less overcrowding in general medical and surgical units and [illegible] candidate a wider basis of experience on which [illegible] his final choice.

The last two or three years of his senior registrar [illegible] should be devoted to his final choice of specialty [illegible] it should not all be spent at an undergraduate [illegible] Time spent working in laboratories and at re[illegible] clinics in other countries during the senior registrar period could be recognised also as a period of training but should not be allowed to any extent to take the place of clinical training.

If at the end of the period of training, or during it he wished to change his mind and choose another specialism he might do so, but he must leave the specialist units where he has spent three *or at most four years so that a bottleneck of trained but unsuccessful aspirants* does not arise; for, as Claude Bernard wrote, 'Fortune only favours the prepared mind.'

During his senior registrar period the aspirant must obtain the higher qualification of the Royal College or faculty which controls his specialty. A diploma—e.g., D.A., D.L.O., &c.—should entitle him to become a specialist (S.H.M.O.) but not a consultant. He is now [illegible] years. According to my scheme his time table has run something like this:

Senior house-officer 1 year; registrar 2–3 years; senior registrar 3–4 years.

His higher qualification taken, he is then eligible to apply in open competition for specialist (S.H.M.O.) posts, for junior or assistant consultant posts, and finally for full consultant posts. The grade of S.H.M.O. must ultimately be replaced by that of senior [illegible] officer.

JUNIOR CONSULTANTS

The ladder of promotion which I suggest thus in[illegible] the controversial status of junior or assistant consultant. But is this suggestion really a new one? Before the [illegible] of the National Health Service did not the [illegible] hospitals have assistant physicians and full physicians and assistant surgeons and full surgeons?

I believe the entrance to all the [illegible] specialties associated with medicine, including pathology, should be through the [illegible] of general medicine, and the entrance to the specialties associated with surgery through the [illegible] of general surgery. I recognise that this principle demands a longer training period, but as compensation I suggest that part of it might well be spent as an assistant or junior consultant now that under the Act the [illegible] position has been established. The assistant or junior consultant would be really an assistant with fewer beds [illegible] chief, but he would have the advantage of [illegible] his specialty [illegible] under some supervision. He [illegible] have the additional advantages of clinicopathological discussions and also opportunities for [illegible] appointment might be whole time, which would be of advantage to himself and the patients [illegible] attending the casualty department of the ho[illegible]

BRITISH ACADEMY OF MEDICINE

The Royal Colleges, faculties, and associations which have been formed primarily to protect and forward the interests of their specialist members and fellows are the bodies which should lay down the conditions of training for consultant status, and the length of time it should take The result of their deliberations would in due course be published, and it is presumed would have to be accepted by the Ministry of Health The conditions and length of time in the different specialties might vary, but probably in none would be less than five years after registration or more than eleven years not counting the preregistration year or National Service

A central committee must ultimately be set up to correlate schemes of training Such coördination must imply a reciprocity at all levels between all the Royal Colleges and faculties In practice this might well lead to the creation of some such body as a British Academy of Medicine If general practice is to be considered as a specialty, then a college of general practitioners will also have to be formed, and take its place as a member of the Academy

THE FINAL GOAL

No promise can ever be made to the aspirant that he will certainly attain specialist or consultant status It was never promised before and there is no reason why it should be different now As a junior or assistant consultant he would be free to apply for a full consultant post anywhere he wishes

Before July 5, 1948, the weak part of the usual arrangement, especially in provincial hospitals, was that the registrar stayed on to prevent any other aspirant coming in to contest the consultant post when it fell vacant It is true that posts on the staff were advertised, but usually the wise registrar had made himself so useful to the staff that they were only too pleased to keep him as he knew all their foibles, likes, and dislikes, and at that period of his career respected or even admired them When a vacancy did occur it was then difficult to overlook his claims The peripatetic nature (journeyman) of the registrar and senior-registrar appointments, and the junior and full consultant, must be maintained to safeguard the proper education of the aspirant No matter how inconvenient it may be for the consultant to lose his registrar, it is inherent in the terms of the appointment of a consultant that he should be prepared to take a succession of young men in to his unit to teach and train them

By some such procedure I believe the standard of work will be maintained, and the aspirants satisfied The service should be elastic, so as to allow an older man to do less work without losing his security of tenure or contract, for there is no method in medicine for the older man to imitate the weary barrister, by taking silk or being transferred to the judicial bench

The so called Welfare State has arrived and will continue in some form or another Social Security is the present slogan, the logical conclusion of Safety First Both are beyond the competence of man to attain or grant Those who plan towards such an ideal should not be blind to the fact that the real incentive to work is opportunity, and every effort should be made to enable the aspirant to consultant status to take opportunity when it offers Nor should the teacher forget that the most impressive form of instruction is teaching by example In the words of Robert Louis Stevenson, with which Grey Turner ended his Hunterian oration, " A spirit communicated is a perpetual possession "

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MEDIASTINITIS FOLLOWING BODY PERFORATION OF THE ŒSOPHAGUS

F Boyes Korkis
M B N Z, F R C S, F.R C S E, I
SURGEON, METROPOLITAN EAR, NOSE AND
LONDON, CONSULTANT E.N T SURGEON,
HILLINGDON HOSPITALS

In this chemotherapeutic and antibic tion of the œsophagus by no means a formation of an abscess, and it is unusual tive mediastinitis following penetration body Having encountered three such relatively short time, I feel that an account be useful

CASE-RECORDS

Case 1 —A spinster, aged 52, was 1949, with a history of having swallowed a Dec 8 report foll was and pencil was been the st H still dy 15, fairly she of and were sc the putrid ing large quantity of foul pus was expectorated.

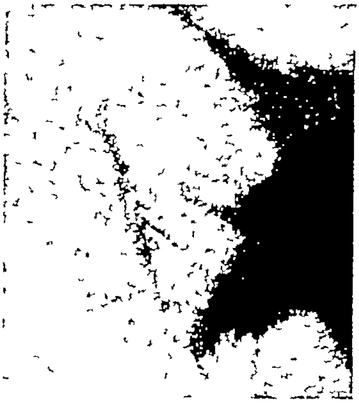


Fig 1—Healed operation wound in case 1

On admission her pulse rate was 90, her tem and her respirations 20 per min, she was toxic, there were bouts of coughing, and thick offensive pus was expectorated T evident fœtor oris The tongue was thickly was swelling, induration, and tenderness of the the neck, more pronounced on the right side A generalised pharyngitis was observed, with coating of the pharyngeal mucosa with thick pus Mirror examination revealed slough and pus in the hypopharynx, with œdema of the mucosa covering both arytenoids A parapharyngeal abscess was diagnosed, and the patient was prepared for immediate endoscopy

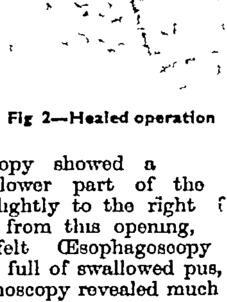


Fig 2—Healed operation

Under general anæsthesia direct laryngoscopy showed a pus, situated at the lower part of the on the posterior wall slightly to the right A track led downwards from this opening, body was seen or felt Œsophagoscopy œsophageal lumen to be full of swallowed pus, appeared intact Bronchoscopy revealed much the mucosa of the larynx, trachea, and was no pus, and no foreign body was found

Operation —External drainage was through a cervical mediastinotomy An along the lower part of the anterior border muscle and the deep cervical fascia was divided along the sternomastoid being retracted laterally The [pre-tracheal] muscles were very œdematous The middle [thyroid] vein was divided after ligation to permit lateral [retraction] ...otid ...h and ...ents. ...blunt ...ion ...fore ...r in a ...inal ...at ...d and ...d the ...of ...roid ...on ...large ...avity ...to and ...hind, ...lower ...ynx ...upper ...hagus, ...urther ...ration ...that ...abscess extended downwards behind the sternum into the [superi]or mediastinum. A considerable quantity of foul pus [was ev]acuated No foreign body could be palpated The [wound] was left widely open, a paraffin gauze pack being [inserte]d after the area had been dusted with sulphathiazole [and pe]nicillin powder

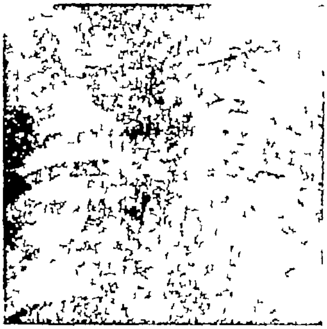


Fig 3—Preoperative radiograph of chest of case 3 showing compression of right apex and widening of mediastinum superiorly

[Bacteri]ological culture of pus taken at the operation grew [strepto]coccus viridans and diphtheroids the streptococcus [was se]nsitive to penicillin and slightly sensitive to sulphon[amides]

[Postop]eratively the patient was put on a glucose-saline drip [for twe]nty four hours and given intramuscular penicillin [...]0 units three times daily and sulphadiazine The [sulpha]diazine was discontinued on Dec 26 after a total of [...] had been given, because the streptococcus was more [sensiti]ve to penicillin. The penicillin injections were stopped [on De]c 27 the total dose being 10,500 000 units The pack [in the] neck wound was changed every second day at first [in the] theatre and later in the ward. The wound was allowed [to clo]se from the depths upwards and by Dec 30 had [practic]ally closed There was then no pus in the pharynx, [and th]e patient was swallowing well She thus made an [uninter]rupted recovery and was discharged completely healed [and sy]mptom free on Jan 18 1950

[Follow]-up —When last seen as an outpatient on Aug 24 [1950] she was still well and the neck scar was surprisingly [soft] and supple with very little contraction considering that [the wo]und had not been sutured Fig 1 shows the scar at [this st]age.

[Case] 2—A married woman aged 63, was admitted on [...] 1950 with a history of having swallowed a chicken [bone tw]o days previously Since that time she had had pain, accentuated on attempting to swallow in [the lower] part of the neck, both anteriorly and posteriorly an[d] backwards towards the scapular region She [could not] swallow food She was a diabetic and had been [...] insulin injections

On admission her temperature was 100 F pul[se ...] and respiration 30 per min Her urine had a spec[ific gravity] of 1·030 and was loaded with sugar She wa[s ...] drowsy with dry and furred tongue There was a [...] brawny swelling of the lower part of the neck and [...] of the larynx from side to side caused pain. M[ediastinitis] secondary to perforation by a foreign body was di[agnosed]

Endoscopy and Operation —Œsophagoscopy und[er] anæsthesia showed a bone impacted in the upper [end of the] œsophagus It was lodged transversely [illegible] torn flaps of mucosa at both ends One en[d ...] disengaged from the œsophageal wall the bone was [turned so] that its long axis was in line with the [long a]x[is of the] œsophagus, and it was withdrawn with ease It [was a] sliver of bone about an inch long with very sharp en[ds. After] its removal no pus appeared from the two trau[matic perforations] of the œsophagus. A cervical mediastinotomy was [done] with the same technique as in case 1 There was [...] emphysema of the tissues of the neck a large para[...] abscess containing thin pus was opened and th[e cavity] was found to track downwards into the superior med[iastinum.] The wound was dusted with penicillin powder and packed widely open with paraffin gauze

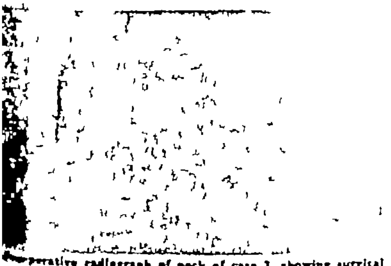
Fig 4—Anteroposterior radiograph of cavity filled with lodi[...] all two we[eks after] operation (case [illegible])

Postoperatively a drip was set up for twenty four hours and insulin and glucose were administered by trial and error until the diabetic condition was brought under control The patient was given penicillin 500 000 units six hourly and sulphadiazine 1 g four hourly at first by injection but later by [mouth] The sulph[adiazine] was stopped on Jan 6 [after a] total [dosage of] 34 g [and] penicillin on Jan 10 aft[er a total of] [illegible] The reason for these high doses was [illegible] infection under control and quickly [illegible] diabetic condition could be stabilised The wound was [dressed] every second day at first in the theatre [illegible] The wound was allowed to close by sec[ondary intention]

Progress The postoperative course was att[illegible] by the diabetes the patient being drowsy and having sugar and [illegible] in the urine until Jan [illegible] she was improved and swallowing well The t[emperature] [illegible] normal and remaining [illegible] Jan [illegible] decreased to [illegible] per min [illegible] By Feb 5 the pat[ient] [illegible] well [illegible] with the diabetes control[led] wound dry and [illegible] healed She was disch[arged] [illegible]

[Follow-up] [illegible] as an outpatient [illegible] 1950 [illegible] was [illegible] with [illegible]

Case 3 A man aged 49 was [illegible] with the [illegible] that he had been eating [illegible] [illegible] when he [illegible] [illegible] and [illegible] time About ten minutes later he had severe pain



[Post]operative radiograph of neck of case 3 showing surgical emphysema.

chest at about the angle of Louis, and later a little lower, about the middle of the sternum Since then he had had severe pain on attempting to swallow, especially solids, with definite delay at the site of the pain, and he had become afraid to swallow anything The pain became gradually worse, feeling like a belt compressing his chest when he tried to take a deep breath. His doctor had tentatively diagnosed coronary thrombosis, and he was sent in for medical investigation

On admission he was found to be a plethoric man with a temperature of 103°F, pulse rate 116, and respirations 24 per min His urine was normal His blood pressure was 120/70 mm. Hg His tongue was heavily furred His cardiovascular system was normal both clinically and electrocardiographically The trachea was central, and the air entry over the chest was good Later the same evening surgical emphysema was noted at the root of his neck on the right side, and mediastinitis from œsophageal trauma was diagnosed.

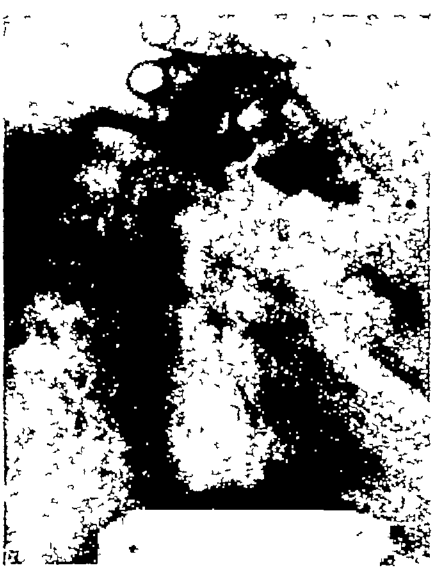


Fig 6—Oblique radiograph of abscess cavity filled with iodised oil two weeks after operation (case 3)

Next day he had pain radiating from behind his sternum to the neck, shoulders, and back, and I was asked to see him There were swelling and tenderness on both sides of the lower part of the neck, with well marked surgical emphysema in the same region Radiography of the chest (fig 3) showed a dense shadow obscuring the right apex, and the trachea was pushed over towards the left Radiography of the neck (fig 4) confirmed the presence of surgical emphysema in the soft tissues, most pronounced on the right side

Operation.—Immediate œsophagoscopy and mediastinotomy were carried out under general anæsthesia Œsophagoscopy revealed a traumatic lesion of the upper end of the œsophagus on the right side, with considerable œdema No foreign body was seen The mucosa of the lower œsophagus was normal A right cervical mediastinotomy (with division of the omohyoid muscle for wider access) liberated a very large collection of thin frothy pus, the abscess cavity extending from the right para œsophageal region behind the sternum into the superior mediastinum and laterally over the apex of the right lung, which was compressed by the pus The wound was dusted with penicillin powder and packed widely open as in cases 1 and 2 A soft rubber feeding tube was passed into the œsophagus and was retained for ten days

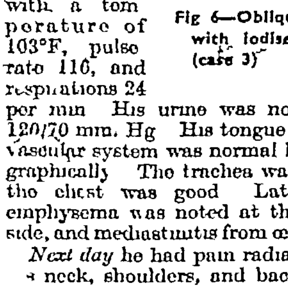


Fig 7—Healed operation wound in case 3

Postoperatively a glucose saline drip was put up for twenty four hours, and sulphadimidine was given until the sixth day to a total dose of 30 g Intramuscular penicillin to a total dosage of about 25,000,000 units was also given The wound was dressed every second day

Convalescence was uninterrupted, the
ing normal after the fifth postoperative day
abscess cavity drained satisfactorily and on June
cavity was partially filled with iodised oil, rad
no communication with either the bronchial
the œsophagus (figs 5 and 6) The patient was
July 15 with a healed wound and symptom
remained well since There is some puckering
of the lower end of the scar (fig 7), but as
restrict head movements, and the scar is
patient's collar, a plastic operation seems

DISCUSSION

The natural history of suppurative
following perforation of the lower pharynx
œsophagus by foreign bodies has been
materially by two outstanding therapeutic
the last thirty five years (1) the introduction
drainage, both as a prophylactic measure
frank perforation without evident infection
means of treating infections and abscesses
the development of chemotherapy and antib
today play such an important part in the p
control of pyogenic infections

Marschik's (1916) technique of cervical
tomy forms the basis of the operation prac
Time has substantiated its value without
such patients usually died, but with op
generally recover

Neuhof in fifteen years collected 66 cases of
No operation was performed in 34, and there were
He personally operated in 22 cases, there were
and only 7 deaths Furthermore, death occurred
in which mediastinal abscesses were not
non fatal cases being non suppurative ones

At first there was a reluctance to operate in
and as lately as 1936 Lilienthal wrote "
afraid to have the mediastinum operated
patient will die if he is not operated upon, a
do worse if he is"

Today there is a danger of forgetting this
lesson, and operation may be delayed too
hope that penicillin and the sulphonamides
cure the patient Once a suppurative process
outside the wall of the œsophagus a
called for, and the sooner the better One
purposes of this paper is to emphasise the
combined surgical and medical treatment if
number of lives are to be saved

Sutton (1945) has reported a fatal case in a gir
who was not seen until late The abscess was
too late, and the patient died, necropsy revealing
glass transfixing the junction of œsophagus and
In my opinion earlier operation might well have
death

Chemotherapy and antibiotics, however, are
maidens of surgery in dealing with suppurativ
tinitis Not only should they be used in full
conjunction with surgical drainage, but also
sometimes avert the need for surgery Perf
wall is not necessarily followed by suppuration
may be no more than a local cellulitis (non
mediastinitis) which can often be overcom
natural defences of the body aided by these
agents The difficulty lies in deciding whether
has taken place (see below) Jones (1946) ha
a case of perforation of the œsophagus
penicillin without the patient developing a
He states that "with the advent of chemot
formidable procedure—i e, mediastinotomy
delayed" I cannot agree with this statemer
first place, with an experienced surgeon
anæsthesia, cervical mediastinotomy is not
but relatively safe and easy Secondly, once
tive mediastinitis has developed, operation sho

What Jones probably meant was that operation ited altogether by preventing the development tive mediastinitis This should be the primary eatment but should it fail, adequate drainage e instituted.

With chemotherapy and antibiotics the day of tic mediastinotomy has passed and the need entic mediastinotomy for drainage is likely to ed.

ew of the literature suggests that perforation of phagus with subsequent mediastinitis most y follows the use of instruments—the coin and the oesophageal probang (now happily pieces) and the oesophagoscope. Perforation gested foreign body with mediastinal infection is non, but not so rare as is often supposed With ition of blind methods of instrumentation and at of skilled endoscopy, most cases will be seen r ingestion of foreign bodies The three cases corded belong to this group the mediastinitis eveloped before any instrumentation In some the causal foreign body is never found Case 3 nature and an almost similar case history has orded by Gaffney (1945)

ient, a male, was eating a hard crust of bread when enced pain in the throat, spreading to the right to the back. Radiography showed a mediastinitis a mediastinotomy was done pus being encountered nt was given 'Neo Prontosil' and recovered

llowing figures demonstrate clearly the relative ncy of this condition The largest series collected of Neuhof (1936) already cited above In admissions to Montreal General Hospital from 1943 Sutton (1945) collected 21 cases of medias ctions from all causes. There were only 15 [illegible] necropsies during this same period despite death rate and the high percentage of necropsies one at this hospital Flott (1945) removed 100 bodies after 473 oesophagoscopies, and in 5 of ses mediastinitis developed and in 1 case a tic mediastinotomy was performed These s were in the prechemotherapy days except se of Flott's. Since chemotherapy became numerous workers have published reports of ngle cases or a small series Sutton (1945) (1945) Maness (1945) Holmes (1946) Adams Engler (1946) Aufses (1946), Jones (1946) (1946), Wolcott (1947) Culver and Clark (1947) oy (1948) have between them published 34 me of these being perforations in the middle or ophagus a problem which is not being discussed n interesting case was that of Maness (1946) astinitis following the inhalation of a peanut onchus, and spontaneous recovery ensuing after scopic removal of the foreign body Foreign ay be present in the oesophagus with perforation ll for long periods without causing mediastinitis A case reported by Rosefield (1946 an impacted remaining in the upper oesophagus for five weeks the point of view of treatment it is important to sh non-suppurative from suppurative medias task often difficult and sometimes impossible times the distinction is self-evident as in case 1 patient presented with a sinus discharging All cases must begin as a deep cellulitis in the geal tissues, time being necessary for the n of pus It follows that the early symptom for both groups and also the general signs—temperature and pulse rate &c It is therefore divide all cases into three groups—early inter and late In the early group it is impossible whether or not suppuration will ensue; in the suppuration is evident It is in the inter iety that the diagnostic acumen of the clinician will be tested to the full If doubt exists, wiser to treat the case as one of suppuration

The patients in the early group complain of a constant pain in the throat and neck which is gr aggravated by attempts at swallowing; the patient dread to swallow his own saliva If he tries to swa food, the aggravation of pain is often greater with f than with solids presumably owing to a leak of through the perforation into the perioesophageal tis Several hours later the patient's temperature and p rate rise After this there is often a well marked temporary remission of symptoms in which the pat both feels and looks better So deceptive may this p be that Neuhof (1936) in the prechemotherapy deferred operation on 3 patients 2 of whom cam necropsy This phase is likely to be more pronoun and longer in the present era of antibiotics and sulph amides but this is no excuse for delaying the admi tration of these preparations Case 1 is a good exam of this phase of remission and it behoves those treat such patients to have them in hospital under c observation

The intermediate phase begins some twenty-fou forty-eight hours after the perforation cases 2 an fall into this group If resolution is going to occur symptoms and the general signs gradually diminis but beware the period of remission! Careful repe observation is indicated Air may escape into tissues of the neck through the perforation and demonstrable by palpation as surgical emphysema or radiography and such a happening does not necessa mean that suppuration has developed There may also deep tenderness in the lower part of the neck with suppuration such tenderness indicating local cellul Symptoms of serious import are radiation of pain fr the local site to the substernal region or to the chest (most important of all) to the back between the scapu Such radiation of pain may confuse the diagnosis first and lead to an erroneous diagnosis of coron thrombosis as in case 3 An electrocardiogram is help in such cases A general deterioration in the patien condition indicates that all is not well A bra tender infiltration of the tissues of the lower part of neck either on one side or on both sides, sugges suppuration in the deeper regions of the neck and this m occur with or without surgical emphysema Additio help may be obtained from serial white-cell counts ma daily The white-cell count [illegible] in most ca initially If resolution is [illegible] the count [illegible] be persistently raised It tends to fall if the [illegible] sufficiently organised to control the infection How ever in fulminating infections the count can be decep and can be low from the start or can fall rapidly from overwhelming infection Therefore the count has to read into the whole general picture Additional ancilla help may be obtained from skilled radiography Straig X-ray pictures of the neck and mediastinal region w [illegible] not only the presence of air in the tissues but a will demonstrate deformation of the normal anatomy the presence of a large collection of fluid if such exi Th[illegible] may be compressed by such [illegible] case 3 or there may be a shift of t [illegible] displacement of the oesophag There [illegible] of the mediastinal [illegible] advocated by Culver and Cl [illegible] Adams (194 states [illegible] perforation [illegible] should [illegible] be diag[illegible] perforati[illegible] hard to [illegible] It is certainl [illegible] and was controlled with subcutaneous H M B 100 mg thrice daily, but oral H M B 1250 mg caused severe diarrhœa, nausea, vomiting, and malaise The blood pressure fell Treatment was continued with subcutaneous H M.B The patient earns her living as a hospital cleaner and attends to her own home (no digitalis, no mersalyl, no salt restriction)

Case 59 —A woman, aged 43 with hypertension following pregnancy toxæmia, had two severe encephalopathic or mild thrombotic episodes with paralysis, followed by recovery There were considerable breathlessness and a mild degree of *angina of effort These clinical manifestations disappeared on* treatment with subcutaneous H M.B , and, when tolerance was established, she could be controlled with subcutaneous H M B 60 mg thrice daily When H M B was given by mouth, 1500 mg caused severe nausea, malaise, pallor, trembling, and shivering, with a fall in blood pressure to 112/92 mm Hg [illegible] the sitting posture, whereas 1250 mg produced no [illegible]preciable fall in six hours' observation

Case 126 —A woman, aged 52, a severe case of essential hypertension was controlled with subcutaneous H.M B 75 mg thrice daily after the acquisition of tolerance When H.M B was given by mouth, 1750 mg was required to produce a fall of blood pressure, which was associated with nausea, diarrhœa, and abdominal pain, whereas 1500 mg produced no apparent effect except nausea

Case 125 —A man, aged 56, with essential hypertension, aortic regurgitation, and chronic cor pulmonale following repeated pulmonary emboli, after two weeks' treatment with subcutaneous H.M B required 100 mg thrice daily When H M B was given by mouth, 2000 mg had little effect, whereas 2500 mg caused pallor, shivering sensations, nausea, and a fall of blood pressure Eventually the patient was controlled with subcutaneous H M B 120 mg thrice daily without which he had severe nocturnal dyspnœa He received continuous dicoumarol treatment for the thrombotic episodes He died of cerebral hæmorrhage

Case 124 —A woman, aged 46, had malignant hypertension Oral H M B 1250 mg four times daily produced only moderate falls of blood pressure and led to indigestion and malaise It was thought impracticable to continue oral therapy because much larger doses would have been needed after development of tolerance to H M B On treatment with subcutaneous [illegible]B 95 mg thrice daily papillœdema has disappeared The [illegible]nt is a farmer's wife and leads an active life, her only [illegible] now being a short period of lassitude after her [illegible]

[illegible]9 —A woman, aged 53, with malignant hypertension [illegible]ac asthma had been bedridden for two years When [illegible] treated with subcutaneous H M B , her papillœdema [illegible]diac asthma disappeared The subcutaneous dose [illegible]table at 200 mg thrice daily The dose of oral H M B [illegible] to lower the blood pressure was 3000 mg , which was taken without causing symptoms A dose of 5250 mg in the course of twenty four hours maintained control of the blood pressure but was associated with malaise and abdominal discomfort In view of the large dose it was thought inadvisable to continue oral treatment On subcutaneous H M B the patient improved (no digitalis, no mersalyl) and can climb stairs and does housework.

The oral dose of H M B required to lower the blood-pressure was much greater in the patients (table II) who could not be treated successfully with oral H M B

In this investigation the effects both of oral and of subcutaneous H M B have been studied in each of 26 patients 8 other patients have been treated here with oral H M B but without subcutaneous H M B , and a much larger number of patients are continuing their treatment with subcutaneous H M B without trial of oral H M B The impression gained from these other cases in no way alters the conclusions drawn from the 26 patients in whom a closer comparison of the effects of the route of administration has been made

DISCUSSION

Oral H M B has a definite place in the treatment of hypertension in that a few patients, at least, seem to be able to continue the treatment indefinitely and to maintain a smooth control over the blood pressure In many patients continued control of the blood pressure presents

difficulty Tolerance develops towards oral
well as towards subcutaneous H.M B In some
as the larger doses are required, malaise and a
discomfort develop about the time an effect on t
pressure becomes perceptible These symptom
seldom prevent the use of oral H M B in an acu
tensive episode, but patients are commonly u
to continue with such treatment indefinitely
patients, however, can take large doses, such as
in twenty-four hours, without developing m
symptoms Such large doses may or may not co
blood-pressure as well as do two or three subcu
injections It remains undecided whether, in the
of important symptoms, it is justifiable to pers
such large oral doses In patients whose subcu
dose of H M B is 100 mg , 4000 or 5000 mg
alimentary tract may be a source of danger i
physiological change leads to greater absorption
absorption with these substances is unlikely, b
decided arbitrarily not to administer very large d
patients not in hospital

There is usually no great difficulty in maint
patients on oral H M B if one is prepared to
maximal blood-pressure falls of 20–30 mm Hg as ad
in severe hypertensives, and there is likely to be
tomatic improvement In conformity with view
about pathogenesis (Smirk 1949) our desire ha
been to explore the effect of restoring the blood p
as nearly as possible to its original normal level
much of the twenty-four hour day as is practicab
are far from this theoretical ideal, but the b
obtained by adhering as closely to this policy
practicable are striking and, in our view give the
indication that this course should be pursued f
though not without considering the details of e
individually We may be rejecting more patie
oral therapy than other doctors do, because or
we aim at considerable blood pressure reductio
50–120 mm Hg maximum systolic fall) and
must increase our oral dosage to a level which
patients induces side effects However, about 1
patients is sufficiently sensitive to be controlled
doses without important side effects and t
commonly the most happily situated of all ou

We have not encouraged patients with side eff
oral doses to persist in spite of these with the tr
it is much more satisfactory for the treat
changed to subcutaneous H M B The assu
several workers that injection treatment on a
basis is impracticable seems incorrect, because
outpatients here are on an injection régime a
30 of them have been under continuous treatm
periods of twelve to twenty three months F
patient treatment to be practicable, patients m
provided with a satisfactory syringe—tubercul
while the dose is small and a good 1 or 2 ml wh
dose is more than 50 mg Glass ampoules, es
with 2 5% solutions, are tiresome, wasteful, a
dilute for the larger doses The H M B should b
solution in multidose containers There is no ob
to the bromide for subcutaneous injection , i
salts are used, it is best for them to be suppli
percentage concentration yielding the same meth
ion concentration as does 10% H M B

The use of large doses of H M B by mouth
disadvantage that symptoms of bromism may so
develop (Locket et al 1951) Only one example of b
was encountered in this investigation There is
of bromism with subcutaneous injections of
because the dose required is so small.

The clinical improvements which follow e
treatment with oral H M B , with adequate blood p
reduction, resemble those following treatment
subcutaneous H M B (Restall and Smirk 1950

has a definite therapeutic effect, and report 5 illustrating the striking results they obtained and Mazer (1922) believed that there may be a eutic action when blockage of tubes is due to recognised catarrhal salpingitis Rubin (1947a) that the therapeutic effect may be psychosoma nsufflation serving as an emotional stimulus which s the tubal and cervical sphincters, while provoking tion in a manner analogous to that occurring in animals

is difficult to judge the therapeutic effect of any ment for sterility, and chance undoubtedly plays a However, if a patient who has been infertile for years or more becomes pregnant within two months o investigation a therapeutic effect may be assumed n (1947b) also includes pregnancy occurring three ths after insufflation in cases where a high pressure necessary to produce patency

f the 100 patients examined with viskiosol six, nancies in 5 can be directly attributed to the investi on It is disappointing that, of the 13 women whose were patent after hysterosalpingography though ously impervious to gaseous insufflation, only 2 me pregnant within two months. 12 other patients me pregnant but some of these had had additional tment and advice about the most fertile period for rcourse, and have been excluded from the results ause it is impossible to attribute their pregnancies to particular factor For purposes of comparison the lts of the first four years of the Birmingham Fertility are given the tubal factor was responsible 17% of the 357 infertile marriages which were pletely investigated (Shotton 1949)

SUMMARY AND CONCLUSIONS

Th history of hysterosalpingography is reviewed r is ample evidence to discredit the oily contrast dia and they should now be regarded as obsolete.

The advantages of the aqueous medium viskiosol six stated Delayed absorption of this medium is hognomonic of hydrosalpinx, and films up to three rs should be taken when this is suspected

Uterotubal spasm is more common with gaseous ufflation than with hysterosalpingography This crepancy may be due to the low temperature of carbon dioxide. Viskiosol six should be warmed to ly temperature before use.

The distribution of pain experienced during the ection bears no constant relation to the site of tubal ckage

Patients investigated by hysterosalpingography fall o three groups (1) those with bilateral tubal occlusion uiring a major operation to overcome the block; those with normal bilateral tubal patency and normal al appearance position and function and (3) those h a degree of abnormality such as stenosed tubes and lateral blockage which is not a bar to conception but ers the fertility of the patient

My thanks are due to Mr D G Ardley of May & Baker for details concerning viskiosol six. This paper reports k done at the North Staffordshire Royal Infirmary and uded in a thesis for London M.D

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TRIAL OF PITUITARY GROWTH HORMONE IN A CASE OF HYPERINSULINISM DUE TO ISLET-CELL ADENOMA

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GROWTH hormone extracted from the anterior lobe o the pituitary gland has a diabetogenic action in cats an dogs (Cotes Reid and Young 1949, and others) W therefore decided to try the effect of giving it to a patien with hyperinsulinism whose symptoms had not bee relieved by partial pancreatectomy After the growth hormone trial a second operation disclosed an islet-ce tumour embedded in the head of the pancreas.

Attempts have previously been made to control hype insulinism by the injection of crude extracts of th anterior pituitary gland Conn and Louis (1946) treate two such patients with an extract which was diabetogen in dogs and observed an intensification of hypoglycæmi Graham and Oakley (1950) found temporary clinic improvement in a woman with hyperinsulinism treate with crude anterior pituitary extract but no alteratio in the glucose tolerance test.

CASE RECORD

The patient a man, aged 27, was admitted to St. Barthol mew's Hospital on Aug 16 1947 Mild hypoglycæmic attac with sweating tremor and hunger had started in Februa 1946 These had become more frequent and severe and sin January, 1947, had ended in unconsciousness Before adm sion attacks had been occurring almost daily The criteria organic hyperinsulinism were fulfilled Starvation produc hypoglycæmic symptoms and eventually coma: an intr

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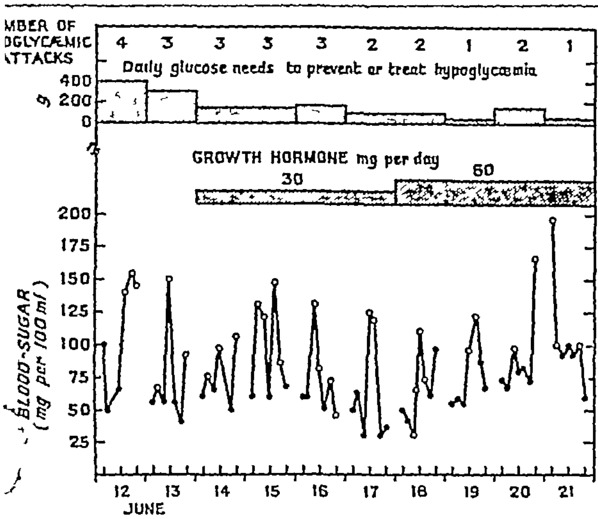

; 1—First trial period of administration of growth hormone in hyperinsulinism, with patient on high-carbohydrate diet and glucose drinks ad lib. : open plotting points, less than four hours after ingestion of glucose , solid plotting-points, more than four hours after ngestion of glucose

nous injection of 5 g glucose resulted in an immediate turn to consciousness Blood sugar levels during the attacks re below 50 mg per 100 ml

rst Operation and its Effects

On Sept 16, 1947, Mr John Hosford explored the pancreas o tumour was found, so a subtotal resection was done, out seven-eighths of the pancreas being removed

After operation twenty four hours' starvation did not oduce any symptoms A sugar tolerance test showed, after g of glucose, a blood sugar level of 190 mg per 100 ml ith glycosuria, but the blood sugar fell to 50 mg at the urth hour

After several months' freedom from symptoms the attacks turned with increasing severity On readmission to hospital March, 1949, the patient's condition was as before operation cept for an increase in the frequency of attacks and a kable increase in body weight It was evident that further surgical exploration would be necessary, but before the second operation efforts were made to control the rapidly increasing obesity Dietary restriction merely led to an increase in the amount of supplementary glucose required to abort or treat the attacks A diet rich in protein and fat and poor in carbohydrate failed to reduce the frequency of the attacks. Thyroid extract was tried without benefit, and finally growth hormone

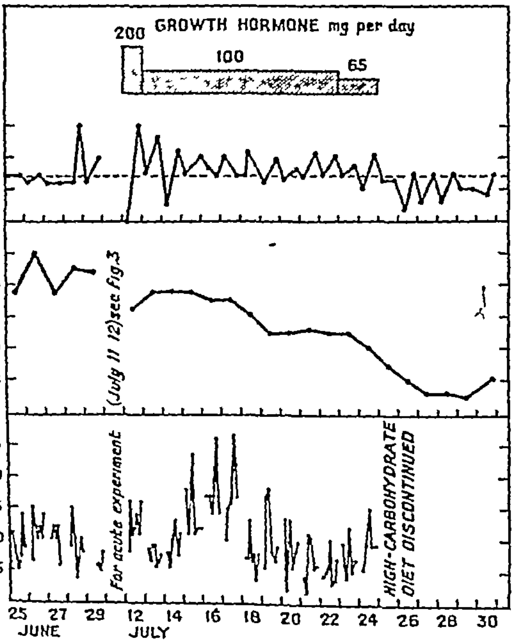

Fig 2—Second trial period of administration of growth hormone in hyperinsulinism with patient on high-carbohydrate diet and glucose drinks two-hourly (glucose 300 g a day)

First Trial of Growth Hormone

During a four-day control period the patient had a diet containing 480 g of carbohydrate and glucose drinks ad lib., and received a daily intramuscular injection of physiological saline solution. During the second two days the blood sugar level was determined every two hours (during the day only) The body weight and fluid balance were recorded daily

A trial period of two consecutive four day periods followed immediately, during the first four days the injections of physiological saline solution were superseded by 30 mg of growth hormone, and in the second by 60 mg of growth hormone The growth hormone was prepared by the method of Wilhelmi et al (1948) and dissolved in saline solution containing 0 01% 'Merthiolate' The solution was sterilised by Seitz filtration

The weight remained constant and the fluid balance unaltered Apart from the readings made within four hours of oral administration of glucose, during the 30 mg period the blood sugar levels were unaffected but during the 60 mg period there was a gradual rise (fig 1) The daily dose of glucose required to prevent or treat hypoglycæmic attacks fell from 400 g per day before giving growth hormone to 50–150 g per day during treatment with growth hormone The frequency of hypoglycæmic attacks fell from about four daily to one or two (fig 1)

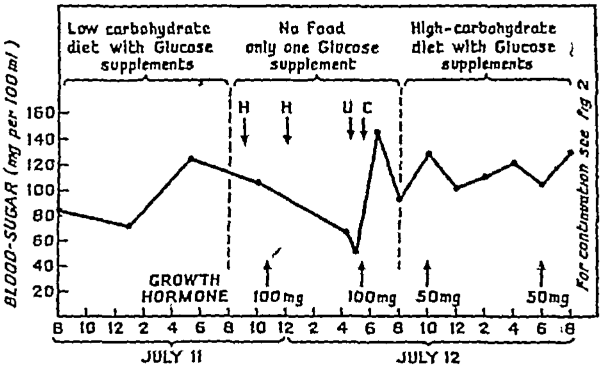

Fig 3—Administration of growth hormone during hypoglycæmic attack : C, consciousness regained ; H, onset of hypoglycæmic attack ; U, loss of consciousness.

Second Trial of Growth Hormone

An ample and carbohydrate rich diet was given to throw extra strain on the pancreas The diet contained 450 g of carbohydrate, with glucose supplements of 300 g in twenty four hours divided into two hourly doses A control period of five days with injection of physiological saline solution was followed after an interval by nineteen days' trial of growth hormone 100 mg per day The findings are shown in fig 2 The general level of the blood sugar rose and then fell The mouth temperature was slightly raised, and the body weight showed a steady fall of about $^1/_2$ lb a day, which persisted for four days after cessation of treatment with growth hormone During the period of weight loss a normal fluid balance was maintained and the calorie intake was more than 4700 per day, whereas during a preceding period of eight days on an average calorie intake of 4000 weight had remained steady

Acute Experiment

During the night of July 11–12, when hypoglycæmic symptoms developed, oral glucose was withheld and growth hormone 100 mg was given intramuscularly After brief apparent improvement symptoms returned, and six and a half hours later growth hormone 100 mg was given After a thirty minute period of observation, when no improvement occurred, it was decided that the experiment should be ended in the interests of the patient, and glucose 200 g was given

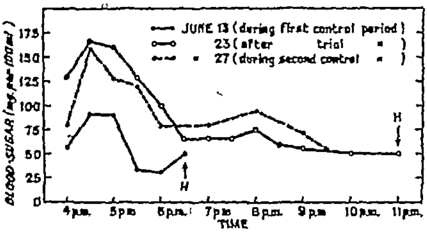

Fig 4—Glucose-tolerance tests in hyperinsulinism (glucose 50 g given by mouth at 4 p.m in each test) : H onset of hypoglycæmic attack.

by oral tube The blood-sugar levels during this experiment are shown in fig 3

Glucose-tolerance Tests

The standard glucose-tolerance test (glucose 50 g by mouth followed by half-hourly determinations of blood sugar) was made before, during and after the first experimental period (fig 4) The blood sugar returned on each occasion to below the initial level within two hours of oral glucose, although differences in the initial levels complicate the interpretation of the results.

During the period of observation glycosuria developed several times, usually in association with high blood-sugar levels but occasionally traces of reducing substances were present in the urine during treatment with growth hormone when the blood-sugar levels had not risen above 150 mg per 100 ml

Throughout the period of observation, and for several weeks previously, the patient was taking thyroid extract gr 3 daily by mouth.

Second Operation

On Oct. 11 1949 Mr Hosford found a small tumour on the posterior surface of the head of the pancreas and enucleated it Dr K C Richardson described the tumour as follows:

The tumour is clearly an islet adenoma composed of cells resembling beta cells There are a few ducts in the tumour and some islands of abnormal acinar cells. I have not detected any alpha cells. The islets in the fragments of normal pancreas attached to the tumour appear to be normal."

Since this operation the patient has remained well and the glucose tolerance test is normal

DISCUSSION

The observed effects of growth hormone were: a *substantial* reduction in the carbohydrate intake required to prevent hypoglycæmia (first trial) a slight over-all rise in the blood-sugar level (first trial 60 mg dose) or a well-marked but transient rise when glucose supplements were standardised (second trial 100 mg dose) a slight pyrexial reaction but no local reaction (second trial); and loss of weight in spite of increased calorie intake (fluid charts suggested that this was not due to loss of water) Growth hormone had a negligible short-term effect on the blood-sugar level as shown by its failure to relieve an attack of *hypoglycæmia* This preparation of growth hormone at no time had a hypoglycæmic effect, in contrast to the cruder pituitary preparation used by Conn and Louis (1945)

The hyperglycæmic action of growth hormone is in accordance with the observation that the hormone is diabetogenic in intact cats and dogs These animals are known to become refractory to growth hormone; thus Young (1938) found that the glycosuria induced in dogs with crude pituitary extract was not maintained unless the dose was progressively increased A similar phenomenon was observed in the present study (second trial) Possibly the aim of curing the patient's condition by irreversibly impairing pancreatic function would have been achieved if a higher dose of growth hormone had been used Alternatively lasting results might have been achieved by giving adrenocorticotrophic hormone simultaneously with the growth hormone since it now app that A.C.T.H may potentiate the diabetogenic actio growth hormone in the cat (Reid 1951 cf Engel et 1951) Although growth hormone is said not to e much antigenic action in man (Kemp 1946 Li 19 the possibility cannot be excluded that the pyrexia, disappearance of the hyperglycæmia and the los weight observed in the second trial may have ha common immunological basis.

The cost of the ox pituitary glands used as a source of gro hormone was defrayed by a grant from the Medical Rese Council We are indebted to Miss D Lister and Mr Chapman for most of the blood-sugar estimations.

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INDICATIONS FOR BARIUM ENEMA I THE DIAGNOSIS OF CARCINOMA OF THE COLON

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SYMPTOMS are often of great value in indicating presence of colonic disorder, but help little in determin its nature. Any colonic symptom or combination symptoms, especially if of recent onset has gener been held to warrant a full colonic investigation, inclu a barium enema in case it should be the first indica of the presence of a carcinoma But, with the excep of bleeding the same symptoms may be found in *colonic disorders including purely functional* o Consequently very many enemas are given with a s proportion of positive results

I have examined the case records of all patients carcinoma of the colon admitted to the London Hosp in 1946 1947 and 1948 to discover how the condi was diagnosed in the hope that this might give a c *picture of the proper indications for the use of the bar* enema There were 110 cases of which 104 were c firmed at operation or at necropsy 4 cases were c sidered inoperable, and 2 patients refused *operat* The site of the growth was as shown in table I confirm the well known fact that over half of them are foun the pelvic colon

METHOD OF DIAGNOSIS

The diagnosis of carcinoma of the colon demand competent history and examination followed by dig examination of the rectum, sigmoidoscopy and so times the barium enema. The 110 cases have b analysed to assess the relative importance of th examinations. *In table II they are divided according the method of diagnosis*

It will be seen that in the largest group (40·4% palpable tumour was present at the time of first exa nation and it was here that the barium enema was m

TABLE I—SITE OF CARCINOMA

Cæcum	17 ([illegible])	
Ascending colon	6 ([illegible])	
Hepatic flexure	[illegible]	
Transverse colon	11 ([illegible])	
Splenic flexure	[illegible]	
Descending colon	4 ([illegible])	
Pelvic colon	[illegible]	[illegible]
Pelvirectal junction	16 ([illegible])	
Total	110	

TABLE II—METHOD OF DIAGNOSIS

Method of diagnosis	No of cases		No of enemas	Results of enemas
Palpation of abdominal mass	51	(46 4%)	31	29 confirmed site 2 unsuccessful
Intestinal obstruction	35	(31 8%)	1	1 unsuccessful
Seen with sigmoidoscope and felt per rectum	7	(14 5%)	0	
Seen with sigmoidoscope and not felt	4		2	1 confirmed site 1 normal
Not seen with sigmoidoscope but felt through rectal wall	5		1	1 confirmed site
Carcinomatosis	1		0	
Acute perforation	2		0	
Ascites	1		1	1 confirmed site
"Barium enema"	4		4	See text
Total	110		40	

useful, for it confirmed that this tumour was in the colon 35 cases (31 8%) presented with acute or subacute intestinal obstruction and were operated on as surgical emergencies, so the question of the value of the barium enema did not arise Likewise, 2 cases were admitted with perforations 16 cases (14 5%) were diagnosed as a result of digital or sigmoidoscopic examination of the rectum or the colon in only 3 of these was the barium enema used, it confirmed the site of growth in 2 and was reported as negative in 1 There was 1 case presenting as carcinomatosis with secondary deposits in liver and superficial lymphatic glands, and the diagnosis was confirmed at necropsy In 1 case the only physical sign was ascites, and a barium enema showed the site of the growth Lastly, in 4 cases only (3 6%) there were none of the above signs, and the diagnosis was made on the sults of a barium enema given to elucidate symptoms ese have been included under a heading of diagnosis y "barium enema," and are summarised as follows

Case 1 —A man, aged 46, was admitted with two months' history of colicky abdominal pain His bowels had not been opened for two weeks in spite of enemas On examination the abdomen was distended, no mass was palpable, and nothing abnormal was felt per rectum A barium enema showed narrowing in the transverse colon, indicating carcinoma, and at laparotomy this was confirmed

Case 2 —A woman, aged 69, complained of distension and discomfort after meals, with increasing constipation for the past three months For three weeks she had had bloodstained diarrhœa, and for three days severe abdominal colic On examination she was distended and tender over the cæcum and ascending colon Examination of the rectum was negative, and an enema was given with a satisfactory result The barium enema showed "a filling defect in/the transverse colon. The appearance suggests the cause may be an extra colonic lesion adherent to the colon." Laparotomy demonstrated a carcinoma of the colon in this situation

TABLE III—CASES IN WHICH A BARIUM ENEMA WAS GIVEN

Result	No of cases
Abnormality found	
Diverticulosis and diverticulitis	25
Diverticulitis with stricture	1
Carcinoma	15
Ulcerative colitis	7
Mass outside colon	8
Regional colitis	2
Gastrocolic fistula	1
Idiopathic dilatation of colon	1
Obstruction from carcinoma of stomach	1
Obstruction from abscess	1
Transverse colon incarcerated in umbilical hernia	1
Diaphragmatic hernia with colon in thorax	1
Total	64
No abnormality found	163
Grand total	227

Case 3 —A woman, aged 56, complained of three months' pain in the left iliac fossa, associated with diarrhœa and the passage of blood and mucus. There had been periods of constipation alternating with the diarrhœa. On examination of the abdomen and the rectum it was uncertain whether a mass was palpable or not, and sigmoidoscopy did not show anything abnormal But a barium enema was held up in the pelvic colon, and the radiologist expressed the opinion that the obstruction was malignant Operation proved the presence of a carcinoma

Case 4 —A man, aged 66, was admitted with five months' history of bloodstained diarrhœa Examination of the abdomen and rectum and sigmoidoscopy showed nothing abnormal A barium enema showed diverticulitis with a probable superimposed neoplasm, and at operation a carcinoma was excised

The most interesting fact that emerges from this analysis is that most of the cases were diagnosed without the aid of the barium enema, and when this investigation was done its greatest value was to locate the site and nature of a mass already felt In 4 cases only could it be said that the diagnosis was made with the enema alone

During these three years there were also 107 cases of cancer of the rectum Of these, 100 were easily felt with the finger, 6 required sigmoidoscopy for their demonstration, and 1 was recognised only at laparotomy for carcinomatosis

THE BARIUM ENEMA

During the third year of this series (1948) 227 barium enemas were given in the radiodiagnostic department of the hospital, mostly where carcinoma of the colon was suspected A summary of the findings is given in table III

This is a very high proportion of negative results and suggests two possibilities either growths are missed, or the indications for this investigation need to be clarified It is possible to prove or disprove the former by investigating the fate of the 163 patients with negative enemas Reference to the case notes showed that no further inquiry was necessary in 66 of these, either because subsequent events excluded the diagnosis of carcinoma of the colon, or because the enema was given for other reasons (see table IV)

TABLE IV—CASES WITH A NORMAL BARIUM ENEMA NOT FOLLOWED UP

Colon normal at laparotomy or post mortem	31
Seen in outpatients 2 years or more later	28
Babies suspected of intussusception (1) or atresia (1)	2
Carcinomatosis with involvement of spinal cord (primary breast lung)	2
To show working of colostomy	2
Subsiding appendix abscess	1
Total	66

There remained 97 patients who had been admitted for investigation of abdominal pain or colonic symptoms, and to them a questionnaire was sent The enemas were given in 1948 and the questionnaire sent out in the last three months of 1950 If a carcinoma had been missed, it is reasonable to assume that by the end of two years the patients would be dead or would have sought advice elsewhere Replies were received either from the patients or from their doctors in 96 cases 6 had died Of these, 1 was thought to have carcinomatosis while in hospital in 1948, but the primary was not discovered and an enema was unsuccessful, he died with intestinal obstruction presumably from a carcinoma of the colon 4 had died of tuberculous peritonitis, hæmorrhage from duodenal ulcer, carcinoma of the stomach, and Simmonds's disease The 6th patient was reported by his doctor to have gradually wasted away with anorexia, finally passing into a stuporose state without any abdominal symptoms or signs of intestinal obstruction All the remainder were alive and well

DISCUSSION

It seems that the barium enema, a most useful investigation in its place is often used unnecessarily This I think, is because it is used to ‘exclude’ rather than to confirm the diagnosis of carcinoma of the colon Any colonic symptom is taken to justify its use, and this policy has caused us to lose sight of the value of a good history and a proper examination A history and physical examination, followed by digital examination of the rectum and sigmoidoscopy, was sufficient to warrant a laparotomy or to make the diagnosis practically certain in 90% of the cases in this series. Of the 40 barium enemas given in the 110 cases of carcinoma, 20 showed the site and colonic nature of a mass that had already been felt 2 enemas were given where the lesion had already been seen through the sigmoidoscope one confirming the growth and the other being reported as normal (carcinoma confirmed by operation) One enema failed in a case of intestinal obstruction; another confirmed the presence of a pelvic colonic growth that had been felt through the rectal wall and another showed the site of the lesion in a case presenting with ascites There remained 4 cases which may be said to have been diagnosed by means of the enema One of these was virtually obstructed (case 1), there having been no bowel action for two weeks in spite of treatment The other 3 patients (cases 2–4) had bloody diarrhœa and 2 of them (cases 2 and 3) had symptoms suggesting subacute obstruction

If this series gives a true picture of the diagnosis of carcinoma of the colon it appears highly improbable that patients complaining only of pain, constipation or diarrhœa, without blood in the stools and showing no abnormal physical signs or abnormality on rectal or sigmoidoscopical examination will be found to have a carcinoma of the colon if a barium enema is given This applies also to what has well been called the “much ballyhooed phenomenon’ of alternating diarrhœa and constipation (Bockus 1946), which is usually due to the misuse of aperients. A discussion of the differential diagnosis between carcinoma of the colon and diverticulitis with its complications is not the purpose of this paper; but it must be remembered that this point can sometimes be settled with a barium enema, and sometimes only at operation

It might be argued that at some stage in the history of patients with carcinoma the symptoms of diarrhœa, constipation or pain only are present But whether an enema would show anything at this time is dubious. Certainly no example occurred in a large series of patients during these three years Further diagnosis is concerned with probabilities, and the conduct of medicine with practicabilities. Most radiologists would agree that a satisfactory barium enema cannot be performed except on properly prepared patients In many hospitals this can be accomplished only by admitting the patient to the ward But it is clearly impracticable that every patient with alteration in bowel habit or colonic pain should be admitted to hospital for examination by a competent radiologist.

In this series there seemed to be no great difference between the histories of many patients with carcinoma and those of many with nervous and functional disorders of the colon Although information obtained from old notes is necessarily limited one significant fact emerges: 81% of the patients with carcinoma had a history of less than six months duration (40% of those presenting with obstruction and 20% of the total had symptoms for less than a month) In clear contrast with this, 60% of the patients with functional disorders had a history dating back for a year or more (only 4% for a month or less)

SUMMARY

The notes of 110 consecutive cases of carcinoma of the colon have been examined to discover how the diagnosis was made

In 61 cases a palpable abdominal mass was pr when the patient was first examined in 35 there signs of acute intestinal obstruction, and in 1 growth was felt per rectum or seen on sigmoidos 4 presented in unusual ways and in 4 only wa diagnosis made with the barium enema in the ab of abnormal physical signs

Out of 227 barium enemas given during the year 163 showed no abnormality Most of these had given to exclude a carcinoma of the colon in patients colonic symptoms without abnormal signs Wi possible exception none of these patients had devel a carcinoma two years later

The barium enema seems to be most useful in reve the site and nature of a mass in the abdomen investigation of colonic symptoms must invar include digital examination of the rectum and sigm scopy These examinations should precede the ba enema and will often render it unnecessary in diagnosis of carcinoma of the colon

I am especially indebted to Dr R. R Bomford who gested this investigation and helped me in the preparati this paper; to Dr M. H Jupe, who allowed me access t records of his department; and to the physicians and surg of the London Hospital for permission to cite their cas

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ISOLATION AND PROPERTIES OF THE THIRD CLOTTING FACTOR IN BLOOD-PLATELETS*

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WE have already described our demonstratio a third clotting factor in the blood platelets (van Cre and Paulsson 1951) This we called factor 3 and we ascribed the anti heparin activity of the bl platelets (Conley et al 1949) Here we report a fu study of factor 3

Chargaff et al. (1936) isolated from platelets a phos tide fraction containing cephalin and a non phosph (lipid) fraction The phosphatide fraction accordin these workers, should strongly promote coagulatio normal blood We applied their method of isolatio the water insoluble fraction of human platelets whic obtained after factors 1 and 2 had been removed the platelets by the method already described Creveld and Paulsson 1951) In this way a phospha fraction and a non phosphatide (lipid) fraction obtained A suspension of the phosphatide frac proved to possess a strong anti heparin activity eve high dilutions in this it differed from the non phos tide lipid also present in the remnants of the plate Table 1 clearly shows the anti heparin activity suspension of the phosphatides (factor 3) isolated the remnants of human platelets compared with activity of the acetone-soluble fraction (contai cholesterol &c.) and with that of a suspension of remains of the platelets containing no lipids

In recent years it has often been asked to what ex thromboplastic substances are present in the bl platelets Ware et al (1949) and McClaughry Seegers (1950) showed that a watery extract of nor platelets had only a slight thromboplastic effect Th workers defined thromboplastins as substances wh

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* This investigation was made possible by the Netherland Orga tion for Applied Scientific Research (T N O)

TABLE I—ANTI HEPARIN ACTIVITY OF FACTOR 3

Heparinised plasma * (ml)	Factor 3 suspension (ml) in dilution			Acetone soluble fraction (ml)	Lipid-free platelet remnants (ml)	Sodium chloride 0 9 % (ml.)	Clotting time (min)
	1 1	1 10	1 100				
1	0 1						7
1		0 1					9
1			0 1				12
1				0 1			∞
1					0 1		∞
1						0 1	∞

* Platelet-deficient normal plasma prepared according to the silicone technique of Jaques et al (1946) To this plasma was added 4µg of heparin per ml

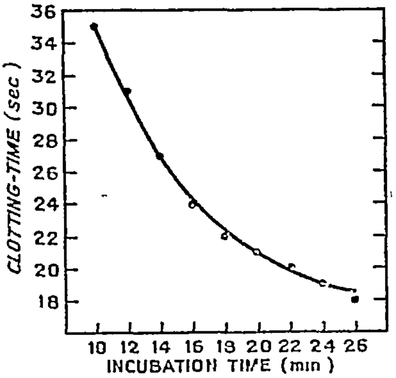
in the presence of serum-accelerator (Quick's labile factor, Seegers's serum-AC globulin) and calcium, can convert pure prothrombin into thrombin

As it has been known for many years that the anticoagulant activity of heparin is neutralised by tissue thromboplastins (Howell and Holt 1918), we investigated how far the phosphatide fraction, containing factor 3, exerted a thromboplastic activity according to the definition of McClaughry and Seegers (1950) We used their technique, which is based on the following principle

> In a buffered solution of pure prothrombin and serum AC globulin, in which sodium chloride, calcium chloride, and colloid content (acacia) are also present and controlled, no thrombin can be formed Only after the addition of a thromboplastin can prothrombin be converted into thrombin

The thrombin is measured by determination of the clotting time of purified fibrinogen after the addition of the incubation mixture

Instead of serum-AC globulin we used a solution of factor 1, which has an activity analogous to that of serum-AC globulin After the addition of a suspension of factor 3 to this mixture containing prothrombin, factor 1 (from human platelets), and calcium, the prothrombin was converted into thrombin (see figure) In the absence of factor 3 no thrombin was formed after several hours' incubation The experiment proves that in platelets the two factors necessary for the conversion of prothrombin are present factor 1 as platelet accelerator, and factor 3 as thromboplastic agent



Thrombin formation during incubation of pure prothrombin with factor 1, factor 3, and calcium

Brinkhous (1947) has shown that the antihæmophilic factor (A H F) present in normal plasma (Bendien and van Creveld 1935, Patek and Taylor 1937) can exert its activity only in the presence of platelets Brinkhous found that the delayed clotting-time in hæmophilia could be restored to normal with platelet deficient normal plasma, and that the incomplete clotting of platelet deficient normal plasma could be restored to normal by the addition of a suspension of platelets Brinkhous suggested that the antihæmophilic factor deficient in hæmophilia is required for the utilisation of the platelets, and suggested that this factor is a thrombocytolysin

As regards this last suggestion, however, we found that the addition of mechanically lysed platelets to hæmophilic plasma deficient in platelets greatly shortened the clotting time of this plasma, but that in the serum obtained after the clotting of this plasma an abnormally large amount of prothrombin † could still be demonstrated (table IIA) Therefore the A H F cannot, or cannot only, act as a thrombocytolysin

Normal values obtained for the clotting time in such experiments do not prove that the process of coagulation is normal Normal formation of a fibrin clot does not necessarily mean that the process of coagulation is normal Coagulation can only be normal if the consumption of prothrombin during coagulation (determined by a two stage method) is also normal

In agreement with Brinkhous we further found that the addition of normal platelet deficient plasma (source of A H F) to hæmophilic platelet deficient plasma greatly shortened the clotting-time of the hæmophilic plasma, but the clotting time did not become normal We found moreover that *the serum of this plasma still contained* a large amount of prothrombin

TABLE II—INTERACTION OF A H F AND FACTOR 3

A Hæmophilic plasma platelet-deficient (ml)	Mech lysed platelets (factor 1 +2 +3) (ml)	Clotting time (min)	Prothrombin in serum µ/ml
1 0	0 1	14	98

Hæmophilic plasma platelet deficient (ml)	Normal plasma platelet-deficient (ml)	Factor 3 suspension (ml.)	NaCl 0 9 % (ml)	Clotting time (min)	Prothrombin in serum (µ/ml)
1 0			0 2	∞	315 (no clot)
1 0	0 1		0 1	35	122
1 0		0 1	0 1	13	90
1 0	0 1	0 1		8	6

B Hæmophilic plasma platelet deficient (ml.)	Factor 1 + factor 2 (ml)	Normal plasma platelet deficient (ml)	Clotting time (min)	Prothrombin in serum (µ/ml)
1 0	0 1	0 1	20	107

The addition of factor 3 to hæmophilic platelet-deficient plasma also shortened the clotting time of the hæmophilic plasma However, in the absence of A H F this clotting-time did not become completely normal, and in the serum of the plasma a large amount of prothrombin could still be demonstrated The addition of both factor 3 and normal platelet deficient plasma to hæmophilic platelet deficient plasma caused a normal clotting time of the latter plasma as well as a normal consumption of prothrombin (table IIA)

It seems that factor 1 and factor 2 of the platelets cannot take the place of factor 3 in this respect—e g, after the addition of factor 1 and factor 2, together with A H F (normal platelet deficient plasma), to hæmophilic platelet deficient plasma the clotting-time did not become completely normal and the prothrombin content of the serum was still much increased (table IIB)

We therefore conclude that A H F requires for its activity the presence of blood-platelets, as already found by Brinkhous The factor in the platelets which is responsible in this process is factor 3 Factors 1 and 2 of the platelets cannot take the place of factor 3 in this respect

SUMMARY

The platelet factor which neutralises heparin is a phosphatide, which we call factor 3

Factor 3 has thromboplastic activity—e g, together with calcium and an accelerator, it converts prothrombin into thrombin

The antihæmophilic substance present in normal plasma requires for its activity factor 3 as a co-factor

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† For prothrombin determinations in serum we used the two-stage technique of Ware and Seegers (1948)

tors 1 and 2 of the platelets cannot take the place of
tor 3 in this respect

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COLONIC REPLACEMENT OF THE STOMACH

EARLY RESULTS OF RADIOLOGICAL INVESTIGATION

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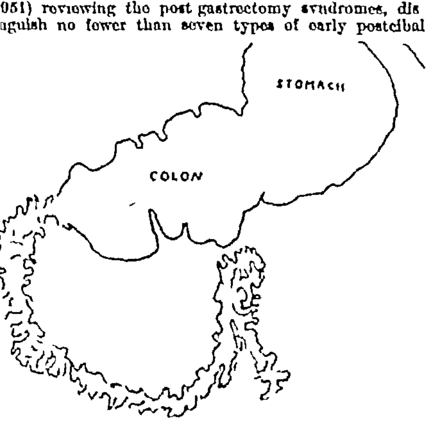
PARTIAL gastrectomy, as at present practised consists removal of up to three quarters of the stomach with bsequent anastomosis of the remnant to the jejunum veral inches beyond the duodenojejunal flexure nsequently most of the reservoir effect of the normal mach whereby the food is macerated and mixed th gastric secretions is completely lost, and with the rmation of a surgical fistula between the stomach d the small bowel a considerable length of the most tive and important part of the small intestine is by ssed Serious interference with the normal physiology the gastro intestinal tract is therefore inevitable. overcome these deficiencies of the Polya type of strectomy, Moroney (1951) substituted a length of the ansverse colon for the resected portion of the stomach g 1) This was intended to increase the capacity the "gastric reservoir and to ensure that chyme tered the small bowel in the normal manner It was lt that this would not only prevent distressing post strectomy symptoms but might also be a means of lieving them when already present Wells and Welbourn 951) reviewing the post gastrectomy syndromes, dis nguish no fewer than seven types of early postcibal syndrome due, they believe to loss of the stomach reservoir or to overloading of the upper small bowel More recently Butler and Capper (1951) have shown experimentally that stretching of the stomach remnant by food and the unsupported afferent jejunal loop will cause most of the symptoms associated with the early post gastrectomy syndromes and they have demonstrated that this stretching can be controlled operatively in man (Capper and Butler 1951) The new technique should not produce these syndromes if as seems probable they are largely anatomical in origin



ig 1—Tracing of radiograph showing relationship of colonic segment to stomach remnant and duodenum

Further, this technique should largely prevent post gastrectomy hypoglycæmia said to be caused by excess production of insulin owing to too rapid absorption of sugar from the upper small bowel the general malnutrition due to inefficient absorption by a 'physiologically shortened' small bowel; inadequate fat absorption with steatorrhœa which Brain (1951) believes to be due to inefficient admixture of pancreatic juice with the food and possibly the poor absorption of vitamin B

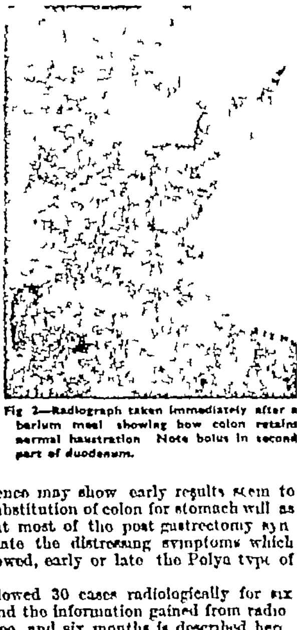


Fig 2—Radiograph taken immediately after a barium meal showing how colon retains normal haustration Note bolus in second part of duodenum.

Whatever subsequent experience may show early results seem to indicate that the substitution of colon for stomach will as was hoped prevent most of the post gastrectomy syndromes, and alleviate the distressing symptoms which have so often followed, early or late the Polya type of gastrectomy

I have now followed 30 cases radiologically for six months or more and the information gained from radiography at one three, and six months is described here with particular reference to the physiological aims of the operation

GASTRIC RESERVOIR

On screening a normal stomach it is common to find that, immediately after ingestion of the first mouthful of barium it is possible to force a little through the pylorus Very quickly however the pylorus closes and for some minutes remains so Not until after peristalsis has begun in the stomach does the pylorus again open to permit passage of the meal into the duodenum This delay allows admixture of food and gastric juices and disintegration of the solid particles of the meal When the stomach begins to empty the meal passes through the pylorus intermittently allowing the duodenum to accommodate itself to one bolus at a time After partial gastrectomy however, barium immediately fills the efferent loop of jejunum and continues to leave the stomach remnant quickly and continuously

When colonic replacement has been carried out, the appearances approximate much more nearly to the normal Barium enters the stomach remnant and soon afterwards fills the colonic segment In some of th earlier cases in which only $2^1/_2$ 3 in of colon was used emptying began almost at once, but when 6 in or 7 in of colon is used, the barium does not at first pass beyond the distal part of the colonic segment, stopping apparently just proximal to the duodenocolic suture line.

In early cases (up to three months after operation) typical haustration of the colon is seen (fig 2), but in some cases seen after six months this is less definite. The colonic segment then resembles more a muscular tube, suggesting that the tæniæ coli may be spreading and becoming confluent. Accurate measurement has not yet been attempted, but it seems that the colon will hold about as much as the stomach remnant, and therefore the capacity is at least twice that of the gastric remnant after a Polya gastrectomy, and possibly nearly two thirds that of a normal stomach. Clinically this is confirmed because, although initially there may be some difficulty in retaining tea (possibly owing to the irritative action of tannin on the colon), the patients find no difficulty in taking a normal barium meal. It is interesting in view of the work of Butler and Capper (1951) that in all the cases in which a simple gastrectomy had previously been performed the stump of the stomach after colon replacement is shorter than before, although no further resection has been done (fig 3).

Within two or three minutes of the filling of the colonic segment some barium begins to enter the duodenum, at first this is only a small trickle, but soon barium can be seen passing along the duodenum, in definite "bolus" formation, as in the normal (fig 4). Until one or two months after the operation the stomach seems to empty passively into the duodenum in this way, and there is often at first some dilatation of the stump of the stomach, with up to twelve hours' delay in emptying. Although this initial delay in emptying is sometimes slightly distressing in the early weeks after operation, causing a feeling of fullness which persists some time after a meal, it disappears gradually but definitely, with the result that at the end of three months no case has shown a residue in the "stomach" after four hours, and the remnant of the stomach proper has by then resumed a normal contour and is smaller than might be expected.

GASTRIC MOVEMENTS

When examined three months after operation, however, some cases show retrograde movements in the colonic segment. These are seen more often as time goes on, and by the end of six months almost every case shows vigorous and fairly frequent contractions. These occur as follows.

About three minutes after the colonic segment has been filled, the distal end contracts, and this contraction—or closing of the lumen, for it is not a wave of peristalsis—proceeds fairly quickly up to the proximal end, expelling the contents of this segment back into the stump of the stomach. A little barium is expelled at first onwards into the duodenum, and some remains adherent to the colonic mucosa, showing, when the contraction is complete, the normal mucosal pattern of the collapsed colon as seen after a barium enema (fig 5). Subsequently, after about a minute, the colon relaxes and again refills from the stomach remnant. Although it is not yet possible to be certain, it appears that this sequence of events occurs about every four minutes while there is an appreciable quantity of food in the "stomach."

These movements, being from right to left, are retrograde in relation to the stomach but normal for the colonic segment, which has been resected from a place where its normal movement is from right to left. It seems likely that these movements are the normal mass movements of the colon made more frequent than usual by the different nature of the pabulum within the lumen in this new situation. So far it has not been possible to demonstrate any associated movements in the transverse colon, although such an association seems likely because the nerve supply of the displaced portion of the colon has not been interfered with. Clinically, the patient does not experience a desire to defæcate when he begins to eat.

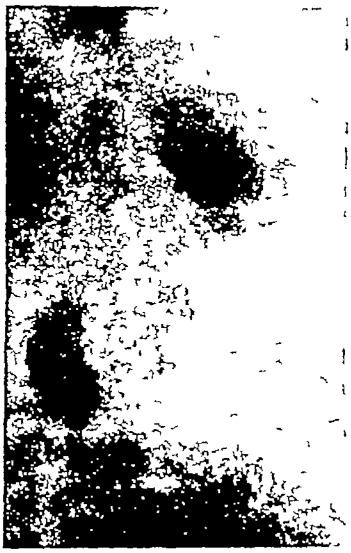


Fig 4—Immediately after barium meal colonic segment has contracted and bolus is passing through duodenum

Thus this procedure gives a "stomach" which, mechanically at least, somewhat approaches the normal. There is a period of retention of the meal in the "stomach," with intermittent emptying into the duodenum, and movements of sufficient vigour to ensure a fair degree of maceration and mixing of the food taken into it.

SMALL INTESTINE

Physiologically, the proximal part of the small bowel is undoubtedly the most important part of the gastro-intestinal tract, and it is this most active section which is short circuited in the Polya gastrectomy. Radiologically, it is most striking to see in some post gastrectomy cases how the first mouthful of barium cream passes quickly through the

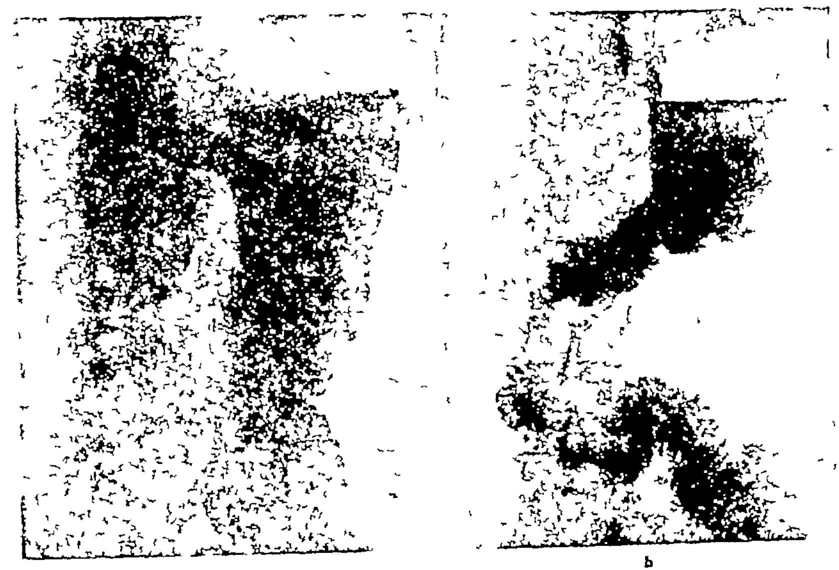


Fig 3—a, Length of stomach remnant after Polya gastrectomy ; b, stomach remnant after colonic replacement is much smaller though no further resection has been carried out.

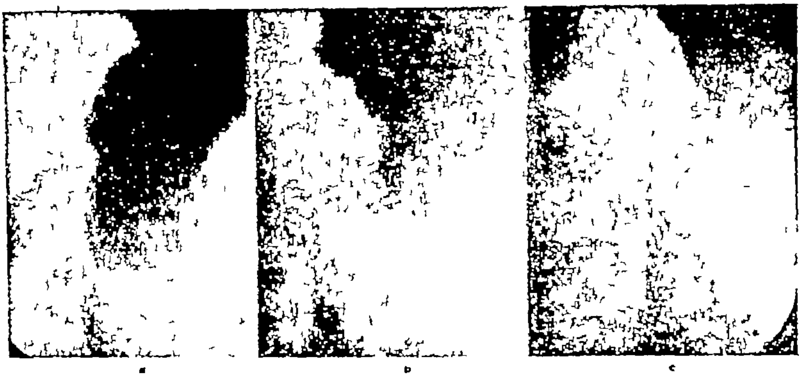


Fig 5—Serial film showing emptying of the colonic segment: a colonic segment full; b contraction has reached mid-point of co
c complete emptying of colon, showing mucosal pattern.

stomach remnant and down a long vertical efferent loop of jejunum reaching almost to the level of the pelvis before the main mass makes any contact with the intestinal mucosa. Colonic replacement of the stomach ensures that chyme enters the small bowel in the normal way through the duodenum Food can thus be intimately mixed with the secretions entering the upper small bowel, digestion and absorption can start at once, and by virtue of the longer length of bowel available both will be more complete

Again passage through the duodenum after this operation is intermittent, and the meal is moved onwards by peristalsis with bolus formation, as in the normal small bowel (fig 4) The peristaltic wave appears to originate high in the second part of the duodenum and carries the bolus over the duodenojejunal flexure onwards into the jejunum Radiologically the jejunum shows the normal feathery mucosal pattern indicating intimate contact between a thinly spread layer of intestinal contents and the jejunal mucosa. With the establishment of normal entry into the duodenum it is to be expected that the rate of passage through the small bowel will be slower than after operations in which the stomach empties directly into the jejunum This is most strikingly shown in the present series by a patient who had originally a posterior gastro-enterostomy

Examination at this time showed that the head c
barium meal consistently reached the rectum six h
after ingestion Since colon has been substituted
stomach, the meal reaches only to the terminal il
and ascending colon in the same length of time

Where there has not been a previous gastrect
more than half the cases show almost exactly the s
rate of passage of the meal after colonic replacemen
before, but in more than two fifths of the cases
passage of the meal is slower than before operat
Most of these are cases of duodenal ulceration an
seems probable that this is due to the preoperative
being rather faster than normal the head of the m
reaching the transverse colon or splenic flexure in
hours After operation it is usual to find only
ascending colon and terminal ileum filled at this tim

COLON

It is well known that fairly long lengths of c
may be resected without any apparent interference
function or with the radiological appearances shown
barium meal or enema In the present series this has b
confirmed and it has not proved possible to identify
site of the end-to-end anastomosis in the transv
colon or to demonstrate any alteration of the nor
haustral pattern The only demonstrable effect

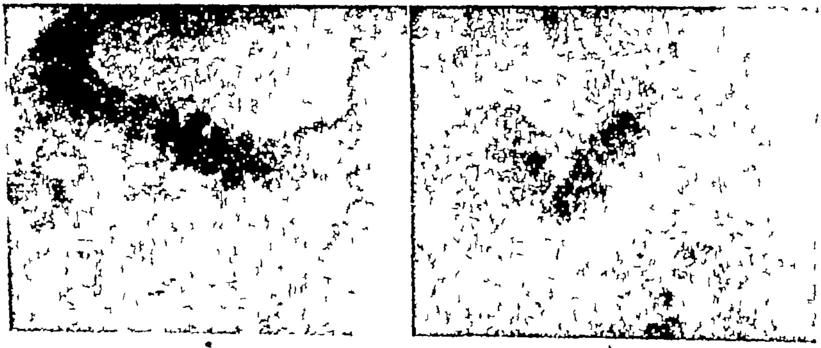


Fig 4—Films taken twenty-four hours after barium meal: a before operation; b after operation.

removal of up to 7 in of the colon for interposition between the stomach remnant and the duodenum is slight lowering of the level of the hepatic flexure. This has been a constant finding in all these cases (fig 6) Mass movements have not yet been seen in the colon postoperatively, and their association with movements in the "gastric" colon is still to be elucidated Although some patients have a mild but definite tendency to constipation, which is speedily relieved by liquid paraffin, it has not been possible to demonstrate radiologically any appreciable delay in the passage of barium through the colon

In November, 1951, eleven months after the first colonic replacement of the stomach, this operation had been performed in over 70 cases, including reconstructions in patients with intractable post gastrectomy syndromes All, except 1 patient with recurrent gastric ulceration due to persistent hyperchlorhydria, were well, had gained weight, and had good capacity for normal meals So far the investigation of these patients has been directed solely towards assessing the early functional results of the operation, and the object of this paper is to set down these early experiences as an aid to those who may have similar cases under their care It is now hoped that it will be possible to explore in more detail some of the physiological problems which have presented themselves and which must be further elucidated before extensive use of the method can be advocated

SUMMARY

The early results of radiological investigation of 30 cases treated by colonic replacement of the stomach (Moroney 1951) and followed for at least six months are presented

These results indicate that the technique is of value in the treatment of peptic ulceration and of early post gastrectomy syndromes

A "stomach mechanism" is produced which has considerable capacity and shows movement, the colonic segment regurgitating the meal frequently into the stomach remnant, ensuring some degree of mixing and maceration of the food

Chyme enters the small bowel intermittently and by the normal route Thus the essential intimate contact between intestinal contents and intestinal mucosa is ensured

Passage through the small bowel may be rather slower than before operation, the meal normally reaching the ascending colon six hours after ingestion

The site of resection of the colonic segment is not identifiable after operation, but the level of the hepatic flexure is always lowered

Although early results have been most encouraging, further clinical and physiological studies will be essential before the operation can be finally assessed.

I wish to thank Mr J Moroney for his invaluable coöperation in this investigation of his patients and for his advice and encouragement in the preparation of this paper

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There ought to be a practical counterpart in this country of the Food and Drug Administration of the U S A, in the form of either a public institute for such work or an extensive and close liaison with other institutions capable of making the necessary investigations Official direction and control of and responsibility for all such matters should ultimately be placed with the Ministry of Health, as this is fundamentally a medical problem "—Sir EDWARD MELLANBY, F.R S, in his Sanderson Wells lecture at the Middlesex Hospital Medical School, London, 1951 (published by the British Medical Association)

UNDERFEEDING AS A FACTOR IN INFANTILE VOMITING

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IN a study of vomiting in infancy (Wood 1951) it was noticed that a substantial proportion of cases left hospital without a satisfactory diagnosis having been made In about half these cases the vomiting seemed to be due to maternal mismanagement or feeding difficulties, and by far the commonest fault was underfeeding I shall here describe briefly how these conclusions were reached and speculate on the reasons for this state of affairs

OBSERVATIONS

The study included 100 consecutive cases under six months of age where vomiting was the presenting or major symptom (Cases of diarrhœa or overt infection were excluded by Cameron's (1925) method of selection) The various causes of vomiting which led to hospital admission were

	Cases
Pyloric stenosis	58
Vomiting of uncertain origin (v u o)	18
Other organic causes (occult infections, cerebral hæmorrhage, &c)	14
Anatomical defects	10

It will be seen that cases of v u o came second only to pyloric stenosis as a cause for admission

During the next year a further 28 cases of v u o were collected in the course of routine hospital practice, making a total of 46 All these 46 infants had been sufficiently ill for them to be referred to hospital for a second opinion and 38 of them were admitted, some for many weeks (We are not, therefore, dealing with the postprandial posset of the well-fed or over-fed baby who is gaining weight) A satisfactory diagnosis, however, was seldom made, and the labels on discharge were

	Cases
Vomiting (no cause found)	19
Underfeeding	6
Pylorospasm	4
Overfeeding	2
Others	7

By following subsequent progress I tried to improve the accuracy of these diagnoses and I came to the unexpected conclusion that underfeeding might be playing a large part, although this was obscured by the fact that a vomiting baby inevitably suffers from self starvation With this in mind the 6 cases previously diagnosed as underfeeding were reviewed, and each was found to have four of the following five features

1 *A History of Underfeeding* —This was deduced in the breast fed from test-weighings, the need to complement, or the failure of lactation , and in the bottle fed by a comparison of the food intake with the infant's needs for its expected weight

2 *Constipation* —This was taken to mean less than one stool per day—admittedly an arbitrary and debatable standard—or the presence of starvation stools Often starvation stools were mistaken for the green stools of a bowel upset

3 *Excessive Swallowing of Air* —These babies were recognised by their gulping habits (Thomson 1921) In cases where a barium feed was given, large air bubbles were seen (fig 1)

4 *Hunger and Crying after Feeds* —This was often mistaken for colic, greed, or hypertonia (Haas 1918) Brown (1948) has emphasised how, all too frequently, it is assumed that every time a baby cries his complaints are due to pain in his stomach

5 *Improvement on an Increased Feed* —In the early cases it was noted that when the feed was fortuitously increased not only did the weight rise but the vomiting subsided—slowly perhaps but inevitably Accordingly, increased feeds were offered deliberately as a therapeutic trial

The following is a typical example of underfeeding

An eight week old baby was admitted with progressive severe vomiting and constipation during the previous few days He weighed 2 oz over his birth weight and was thought to be suffering from pyloric stenosis. The breast milk had gradually declined from the fifth week when a complement was ordered, to the seventh week when it failed completely. He was then given a weak feed (16 calories per oz.) based on his actual weight of 7 lb. 8 oz., although his expected weight was about 10 lb. He was therefore receiving only 310 calories daily instead of 500 and this apparently precipitated the onset of the vomiting which led to admission.

He presented the usual picture of marasmus, but was lusty, bright-eyed and extremely fretful. No evidence of pyloric stenosis being present he was allowed to take from his bottle until he seemed satisfied. The result was interesting: he took 10 oz. at each of the first two feeds, instead of his previous 3½ oz., and then slowly reduced his intake until he settled for 5 or 6 oz. per feed. His symptoms disappeared in a few days. It was then decided to try the effect of returning to his original feed but after two days the ward sister abandoned the experiment because she could not watch this process of semi-starvation any longer (fig. 2). The mother of this child and her advisers had not considered he was underfed.

Once we were able to recognise these symptoms for what they were we realised that we had been missing cases.

By looking for these signs of underfeeding in the 40 cases of V U O which had not received this diagnosis a further 10 cases were recognised all having four of the five criteria described. The following case illustrates this point.

This baby had been breast fed for a few days only when he began to vomit and have starvation stools. He cried a great deal, seemed to be in pain, and as a result was taken from the breast and given various foods, all of which were weak and apparently based on his actual rather than his expected weight. His vomiting gradually became worse and he lost weight.

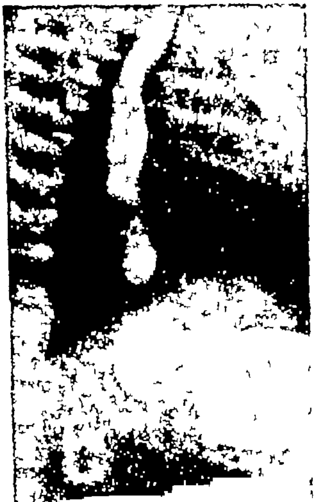

Fig. 1—A barium feed in an underfed baby showing air bubbles.

On admission at six weeks of age he weighed 12 oz. under his birth weight. In hospital his symptoms continued and increasing amounts of Benger's food were added to his feed to thicken it. The chart of weight and calorie intake shows that as soon as the feed was adequate for his expected weight he began to gain, long before mixed feeding was started (fig. 3).

His mother wrote later: "I found that he needed much more food than a normal baby and that he vomited if not given enough. She felt that if she had dared to give him more in the early stages she might have avoided his admission to hospital. It seems probable that this infant's needs were above average, that he swallowed air because he was never satisfied, and that the thickening of the feed helped him as much by its calorie value as by its consistence.

DISCUSSION

According to these observations underfeeding was an important cause in 16 of the 40 cases of V U O studied. In 10 of them it had been unsuspected in hospital, passing unrecognised as "feeding problem" hypertonia or c
Most of the cases were admitted because they w
suspected of having pyloric stenosis and while
accounts for a large proportion in hospital practice
outpatient departments and welfare clinics underfe
may be even more common among cases of vomi
not severe enough to reach hospital. The diagn
becomes fairly certain if the child improves on increa
feeds. There are, however, other cases where the vomi
tendency seems to be inherent in the baby. The ac
cause of the vomiting in underfed infants is though
be the gastric distension caused by swallowing of
which was excessive in 10 of the 16 cases.

Why should underfeeding be so often overlook
In a case of vomiting the tendency is to reduce
diet. While this treatment is undoubtedly sound if t
is evidence of acute vomiting (Hutchison and Monc
1940) gastro-enteritis, or bowel intolerance it may
be the best if vomiting is accompanied by constipat
In most of my cases vomiting began during bre
feeding often as the supply was failing. A small, w
feed was substituted and this was steadily weakene
symptoms grew worse. Often the infant was fed accor
to its actual rather than its expected weight with r
instructions based on 2½ oz. per lb. per day.
high incidence of underfeeding in hospital practice
shown by Paterson and Marr Geddes (1927)
Illingworth (1940) thinks that most feeding problems

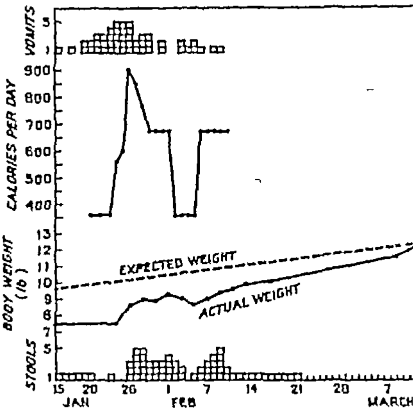

Fig. 2—Gain in weight and diminished vomiting following incre
feeds; relapse after return to original feeds.

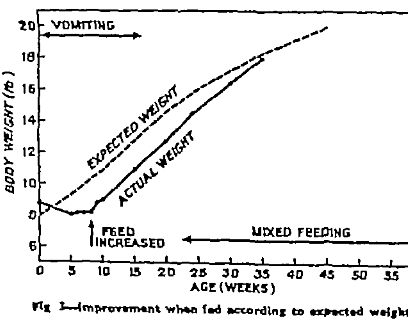

Fig. 3—Improvement when fed according to expected weigh

man-made It is unfortunate that an infant who for some reason has to be bottle fed, should be further penalised by too strict a feeding schedule taking no account of his individual needs In comparison with the automatic regulation of the intake of the breast-fed infant day by day and feed by feed, the precise instructions so often insisted upon are too rigid Wide variation of intake by normal infants was demonstrated by Wallgren (1945), who concluded that there is no significant correlation between body-weight and breast milk consumption at a given age, and that at a given weight one baby may take nearly twice as much as another over a forty-eight-hour period of test weighing It seems probable that most *feeding problems are recruited from the ranks of these eccentric feeders when they are subjected to too rigid a diet*

Aldrich and Hewitt (1947) used the term "offer" rather than "give," and allowed the baby to feed until satisfied On this self regulating system some infants took and retained twice as much as before—a strong argument for greater flexibility on the lines suggested by Gesell and Ilg (1937) Babies stop and refuse to suck when they have had enough, whether from breast or bottle, but if they are still hungry when the bottle is empty, their cries of hunger are often attributed to wind, colic, or even overfeeding The statement of Naish (1948) that cases of underfeeding in breast-fed babies are legion while those of overfeeding are very rare may have even more general application Vomiting is often accompanied by crying, insomnia, constipation, loss of weight, and increased muscle tone These symptoms were described by Haas (1918) in hypertonia and these children are often diagnosed as such Such symptoms do not seem to differ very much from those of hunger, indeed Nelson (1940), describing the hypertonic infant, states that "he never seems satisfied with his feed" Perhaps in some cases this dissatisfaction is the cause and not the result of his hypertonia. Gordon (1948) has stated his belief that the hypertonic infant is on the increase owing to the race of modern life Might not this be due to rigid, *so called "scientific" feeding methods* replacing the common sense and motherliness essential to satisfactory *infant care?*

SUMMARY

A review of 46 cases of vomiting of uncertain origin referred to hospital suggests that in 16 of them the cause of vomiting was underfeeding

In 10 of these 16 cases underfeeding had not been suspected during the infant's stay in hospital

It is suggested that underfeeding may be even more common outside hospital practice

A plea is made for more flexibility in feeding schedules for artificially fed infants

I am very grateful for the help given to me by Prof J M. Smellie and the consultants at the Children's Hospital, Birmingham, and for permission to examine cases under their care I am indebted to Mr J Gregory Williamson, A I.B P, and Miss B Field for the photographic work. Finally I want to thank the sisters and nurses in charge of the various wards for their coöperation and helpful criticism, and the mothers of the infants studied, many of whom kept careful records

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Criminal Responsibility

THE psychiatric section of the Royal Society c Medicine met jointly with the Medico-Legal Society o Dec 11, under the chairmanship of Dr DESMOND CURRA to discuss Different Approaches to the Problem c Criminal Responsibility

SIR NORWOOD EAST surveyed some of the opinion held by various authorities On the subject of "unfitnes to plead" he said that in England and Wales case dealt with in this way at the beginning of the centur were only about a quarter as many as those found "guilty but insane," whereas in Scotland prisoners found "insane *in bar of trial*" were *four times* as numerous as those found guilty but insane In the English courts the accused was brought before a jury who could pronounce him "insane and unfit to plead," but in Scotland the equivalent finding of "insanity in bar of trial" was frequently made without a jury This seemed to him an anomaly, he could not see why a jury was necessary to find a man guilty but insane, and yet not necessary to find him insane in bar of trial Moreover, not being brought before a jury might be said to deprive the insane person of his chances of acquittal or of later appeal to the Court of Criminal Appeal, and inevitably gave an air of secrecy to the manner in which he was dealt with by the law He had every sympathy for doctors who refused to be coerced into declaring an accused insane person to be unfit to plead In his opinion, insanity did not necessarily involve unfitness to plead, for an insane or mentally subnormal person might be quite capable of instructing his counsel and understanding the procedure of the court, just as it was recognised by the law that a certified mental patient might be capable of making a valid will or instituting proceedings for divorce As regards the concept of "guilty but insane" under the McNaughten rule, he felt that on the whole it worked satisfactorily The addition of the criterion of "irresistible impulse" had been advised by Lord Justice Atkins's commission in 1923 but had been rejected by the House of Lords It was difficult to be convinced of the existence of an irresistible impulse unless insanity was present, otherwise, the only proof that an impulse was irresistible might be the fact that it had not, in fact, been resisted

After-trial medical inquiry into the state of the *prisoner's mind* was a valuable practice He had given it as his opinion before the Royal Commission on Capital Punishment that *without this safeguard* there was inevitably a risk of insane murderers being hanged. In general, Sir *Norwood East considered that the present* system of determining criminal responsibility in this country was just and fair Criminal *responsibility* was a legal concept of which the public approved, and crisp and clear cut views were essential *it was necessary* that juries should be protected from the conflicting theories of disputing medical experts

Mr ANTHONY HAWKE said that both the medical and the legal profession were united in a common desire that justice should be done, and in the opinion of most people who shared this desire the question of an accused person's criminal responsibility was best left to the decision of a man's fellow citizens, under proper direction A jury was not required to decide on a man's insanity but on his criminal responsibility He held that the concept of "irresistible impulse" was unnecessary as a separate entity, and that it was adequately covered by the second limb of the McNaughten rule He agreed with Sir Norwood East's opinions about the importance of the procedure of after-trial medical inquiry, and that the accused man's insanity before trial should be decided by a jury

Dr T C N **Gibbens**, in a brief account of the attitude to criminal responsibility in the U S A , said that in 20 of the 48 States some variation of the McNaughten rule was used, usually with the first clause including the second In 17 States the concept of irresistible impulse was recognised. In the State of New York two psychiatrists attached to the court decided *on a man's unfitness to plead* and an insane person was exempted from trial This had three disadvantages (1) the prisoner had less chance of an acquittal ; (2) if he subsequently recovered from his insanity he could be returned to court to stand trial , and (3) it might also cause resentment in the insane criminal that he had been dealt with administratively and not tried before a court

Prof. E W **Anderson** said that he was against the concept of irresistible impulse He did not believe that psychiatry was yet scientific enough for the law to be altered in deference to the theories of some of the more vocal psychiatrists. He deplored in particular, the way some psychopaths were allowed to get away with serious offences on the grounds of mental instability ; and he believed that in some cases psychotherapy produced no better results than did penal methods

Dr J C. M **Mathieson**, speaking as a prison medical officer felt that the powers of the Home Office to remove insane persons awaiting trial might be used more often He pointed out that if an accused person though insane, pleaded guilty and this plea was accepted that person became a convicted prisoner and could be certified only under the Criminal Lunatics Act. This necessitated the convicted person being sent to prison He or she could not be certified under the Lunacy Act within the precincts of the court as sometimes defending counsel asked the court to order

Dr D **Stafford Clark** agreed that medical witnesses who disliked the McNaughten rule should not try to alter it in the witness box. He thought however that the rule was inadequate for it paid no attention to the emotional side of mental illness which it treated as something that affected only a man's reason The McNaughten rule worked quite well because common sense and good will got round it but he shared the opinion of Sir David Henderson that this was an unsatisfactory state of affairs.

MANCHESTER MEDICAL SOCIETY

Indications for Therapeutic Abortion

In the section of medicine on Dec 5 Prof W I C. **Morris** spoke of the difficulty of laying down broad indications for therapeutic abortion or even in the isolated case, of judging whether it has been genuinely helpful or whether refusal to perform it has done harm The operation is not without its risks immediate and remote Among the remote risks must be included the sense of personal guilt which some patients feel, and paradoxically the demand for repetition of the operation in successive pregnancies The chief justifications for therapeutic abortion are conditions in which the continuance of pregnancy jeopardises the life of the mother or seriously menaces her physical or spiritual health *Only* when the continuance of pregnancy itself constitutes the major risk is the operation soundly indicated The risks of labour and the dangers of parenthood are not complete justifications. Conditions in which continuance of a pregnancy is likely to result in the birth of a deformed or unhealthy child are debatable indications : the indication may be accepted more readily when such abnormalities as anencephaly are detected radiologically than when deformity is a mere matter of probability It seems very doubtful whether rubella in the first twelve weeks of pregnancy is a justification in all circumstances for the induction of abortion

In systemic disease, the chief reasons for inducing abortion lie in the management of the failing heart. Pulmonary tuberculosis rarely presents a clear indication, and the obstetrician must be wary of requests to terminate pregnancy arising from failure to provide adequate inpatient accommodation for the pregnant woman with phthisis Hypertension seldom an unquestionable indication, is often accepted with superimposed pre-eclampsia or with a history of previous toxæmia or accidental hæmorrhage *In Bright's disease, the indication* is decidedly obscure, and many patients miscarry spontaneously if treated conservatively Diabetes, unless complicated by nephropathy rarely justifies intervention Disseminated sclerosis does not seem to be influenced favourably The place of therapeutic abortion in the psychoses is very doubtful except in recurrent psychoses clearly related to pregnancy

Prof **Crighton Bramwell**, in considering the cardiac complications of pregnancy thought that therapeutic abortion should be carried out in those patients who have had congestive heart failure apart from pregnancy (to be done in the first three months of the pregnancy), those who have gross cardiac insufficiency on slight exertion, those with acute pulmonary œdema in mid pregnancy, and those with severe mitral lesions

The difficulty in making an unbiased decision was emphasised by Sir **William Fletcher Shaw**, who urged that each case should be judged on its own merits. He was doubtful about the so-called dangers to the fœtus associated with rubella in the mother during the first twelve weeks and he did not believe that rape ever occurred

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Reviews of Books

The Urology of Childhood

T **Twistington Higgins** O B E. F.R C S., senior surgeon Hospital for Sick Children, Great Ormond Street ; D **Innes Williams** M.D., F R C.S surgeon, St Peter's and St Paul's Hospital, genito-urinary surgeon Whipps Cross Hospital ; and D F **Ellison Nash** F.R C.S., assistant surgeon, St Bartholomew's Hospital, surgeon to the Children's Hospital Sydenham. London : Butterworth 1951. Pp 280 45s

This welcome book describes congenital malformations infections stones, and neoplasms of the kidneys bladder, ureter and urethra found in children. A section covers embryology and another enuresis Some of the conditions described are exceedingly rare and may be seen only once in a lifetime The text is commendably written and carries no padding or unnecessary words. Every sentence is thus significant, and the book must therefore be read carefully It is well illustrated with X ray plates, supplemented in places with line drawings. Some of the X ray plates have not reproduced satisfactorily and a greater profusion of small inset line drawings would have been useful. The statement that ' *fluid is better restored to the body* through the mouth than by the veins is worth noting for it seems that many of the younger generation of surgeons have forgotten that the patient has a mouth. On the same page we find ' the value of a biochemist with sufficient clinical contact, to enable him to adjust the nature and amount of parenteral fluids can scarcely be over-estimated How many intravenous infusions in this country today are controlled by a biochemist ? How many biochemists ever set foot inside a hospital ward ? These are important principles, needing emphasis and might have been discussed at greater length. As the book will be read outside this country, the special children's cystoscopes and urethroscopes, as well as the apparatus used in cystometry might have been illustrated One great advance in the urology of children in recent years has been the Denis Browne operation for hypospadias , and the description of this operation has been largely reproduced in Browne's own words. The chapter on tuberculosis is somewhat disappointing, the subject being briefly dismissed, whereas neoplasms of the bladder are dealt with at much greater length Tuberculosis, however, is much the commoner disease Again, adrenal cortical tumours, neuroblastomas, ganglion neuromas, and phæochromocytomas are described in detail, while hydroceles, undescended testicles, ectopic testicles, torsion of the testicles, and hæmatoceles—all relatively common conditions, well within the province of the urologist—receive no attention at all Obstruction to the urinary outflow from congenital anomalies—often the cause of chronic pyuria in children—is comprehensively reviewed, and this section is profusely illustrated and encyclopædic in scope Wilms tumours are well described, and generously illustrated, with some particularly good photomicrographs The chapters on enuresis and infection of the urinary tract are of equal interest to the physician, the surgeon, and the psychiatrist

The book is an important contribution to the urology of children

Human Fertility

The Modern Dilemma Robert C Cook. London Gollancz 1951 Pp 351 21*s*

The author is not alone in his view that overpopulation—too many mouths for too little food—is the gravest danger before the human race, and that the differences in birth-rate between those who live comfortably and those on the edge of starvation will end in a progressive deterioration in our average mental capacity He writes for the layman and illustrates his argument very aptly by conditions in Puerto Rico, where half a century of American charity in money, medicine, and food has doubled the population and lowered a standard of living already low To make his point more clearly he has sketched in history, economics, preventive medicine, and genetics The exposition of the last is really good The rest is exhilarating but unreliable for example, he attributes the fall in Irish population between 1851 and 1951 to a marriage age later than that usual in the rest of Europe, without mentioning four million emigrants To avert our ills and cure our discontents he has no use any programme to increase the produce of the soil pins his faith in a (so far undiscovered) contraceptive to be taken by mouth Almost as an afterthought brings in Lysenko and some frightening facts about erican policy in Japan which have not, so far as we know, appeared in the English press

Joll's Diseases of the Thyroid Gland

F F Rundle, M D, F R.C S, Unit of Clinical Investigation, Royal North Shore Hospital, Sydney, Australia London Heinemann Medical Books 1951 Pp 520 84*s*

There can be few literary tasks more difficult than that of revising another man's book, particularly when the author was as individual as the late Cecil Joll Mr Rundle has accomplished his task with considerable success, but, where so much has been made obsolete by the advance of knowledge, it might have been better to make a fresh start The present edition, in which Joll's own contribution amounts on a rough assessment to about 30%, is shorter than the first by well over 100 pages, and this shows that the revision has not merely consisted in piling further items on the original structure The chapter on the eye signs of Graves's disease appears in a completely new form illuminated by Rundle's original work, and it is probably the best account of this subject to be found anywhere There is an adequate description of the recent advances in thyroid physiology, most of which have followed the introduction of radio iodine and the antithyroid drugs The use of radio iodine in clinical diagnosis might have been treated more fully, particularly as estimation of the basal metabolic rate is allotted more space than it really deserves. The routine use of this test in the control of thyroid therapy for myxœdema is surely neither practicable nor necessary Special chapters have been contributed by N F Maclagan on biochemical anomalies, by G Crile on subacute thyroiditis, by J C McClintock on malignant disease and by E S Rowbotham on anæsthesia, and are of the high quality to be expected

The Early Diagnosis of the Acute Abdomen (10th ed London Oxford University Press 1951 Pp 270 15*s*)—Mr Zachary Cope has done more than most to ensure that students and doctors learn to recognise acute abdominal cases early, and to distinguish the finer points which may sometimes mean life or death to a patient The latest edition of this short book, so closely packed with his personal experience, has needed little change to bring it up to date It is as welcome as ever

New and Nonofficial Remedies (1951) (Issued by the Council on Pharmacy and Chemistry of the American Medical Association Philadelphia and London Lippincott Pp 782 27*s*)—The output of new drugs appears to be even more formidable in the United States than it is in this country This publication, revised annually, attempts the difficult task of selecting those which are likely to prove of real therapeutic value, or which represent a definite advance on some previous compound of a similar kind No preparation is included until it has passed the rigorous tests and standards laid down by the council While many of the drugs described are not marketed here, the book is a valuable guide to those which have made the crossing

The Sober Truth Alcoholic Realities (Leicester Edgar Backus 1951 Pp 63 6*s*)—This little book gives a brief and practical outline of the problem of alcoholism, the extent of our present knowledge of its underlying causes in the alcoholic's personality and heredity, and the methods nowadays used in treatment Dr Lincoln Williams wisely emphasises the fact that no chronic alcoholic is ever " cured," and that the only hope for anyone to whom alcohol has become an addiction is to give it up completely and for ever Of the ways in which this desirable outcome may in suitable cases be achieved, the account here given of the aims and methods of *Alcoholics Anonymous* should be familiar to medical readers The book is clear and straightforward in style, and written in a humane, sympathetic manner It should be useful to the doctor or family or friend of the alcoholic, and it will not offend the patient himself either by levity or a superior moral tone

Biochemistry for Medical Students (5th ed London J & A. Churchill. 1951 Pp 528 22*s* 6*d*)—Writers of new editions of standard textbooks are all in the same predicament Their subject, whatever it may be, has eaten the food of the gods and is growing almost out of recognition Mr W V Thorpe, PH D, has a particularly forward child in biochemistry He has been obliged to recast all his chapters on metabolism in order to put the tricarboxylic acid cycle in proper perspective as the final metabolic pathway common to amino acids, carbohydrates, and fats Detoxication has become a special aspect of metabolism, enzymes have provided much new matter for discussion, our knowledge of the amino acid content of proteins has grown considerably Isotopes are being used more and more freely in biochemical investigations, understanding of hormones is expanding, and we have discovered many new facts about the vitamin contents of foods Dr Thorpe has packed as much as he can into this stocky volume

Orthopædic Nursing (Edinburgh E & S Livingstone 1951 Pp 400 25*s*)—This clearly written book should be readily understood by student nurses and assistant nurses The detailed nursing attention required by orthopædic patients is here set out by a nurse, in the true sense of the word Miss Mary Powell is, besides, assistant matron, in charge of the children's annexe of the Robert Jones and Agnes Hunt Orthopædic Hospital The descriptions and illustrations of apparatus will leave no doubt whatever in a student nurse's mind as to the particular requirements for the specific conditions treated The methods of preparing and applying plaster of paris, both for splints and plaster cases, are well described, and this section should be useful not only to the student but to the outpatient nurse and ward sister It is disappointing to find no single reference in the whole book to the postoperative care and nursing of the amputee, but perhaps future editions will include this The book is well illustrated—always an advantage for students, who do much of their learning visually

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The Kidney, by A C Allen (see *Lancet*, 1951, ii, 1166), is being published in this country by Messrs J & A. Churchill The price is to be 5 guineas

THE LANCET

LONDON SATURDAY, JANUARY 5, 1952

Getting and Spending

Life in capital cities has always had its advantages, but in a small country like ours the shepherd in Cumberland should be able to get as good medical care as the docker in Limehouse. One of the objects of the National Health Service was to lessen geographical inequalities and already much has been done to distribute consultants and specialists more evenly through the regions. That there is still a long way to go is shown by the two tables reproduced below, which were provided in answer to questions by Mr J. E. MacColl in the House of Commons on Dec. 7. The sums allocated to the Metropolitan regions (here including the teaching hospitals within their area) are much larger than those for the rest of the country: thus, when the North West Metropolitan hospital area receives £7 5s 8d per head of estimated population, the corresponding figure for Sheffield is only £3 17s 1d. There are obvious reasons, of course, for some disparity. The London regions have a higher concentration of teaching centres, both undergraduate and postgraduate: indeed the North West Metropolitan region has within its boundaries no fewer than 5 undergraduate teaching hospitals and 9 postgraduate institutes, and these are responsible not only for students from outside London but also for many patients coming from afar. Even with further decentralisation some of these patients will still travel to the metropolis—if only because (to give one example) there are parts of Devon with an easier journey to London than to the regional centre at Bristol. Probably, however, the main reason for the greater expenditure of the Metropolitan regions is the better development, in London and the Home Counties, of peripheral district hospitals now providing a full range of consultant services.

TABLE I—ACTUAL EXPENDITURE OF REGIONAL HOSPITAL BOARDS, HOSPITAL MANAGEMENT COMMITTEES AND BOARDS OF GOVERNORS FOR THE YEARS 1949–50 AND 1950–51 AND ESTIMATED EXPENDITURE FOR THE YEAR 1951–52, EXPRESSED AS A COST PER HEAD OF ESTIMATED POPULATION

Region	Capital expenditure per head of population			All other expenditure per head of population		
	1949–50	1950–51	1951–52 (Estimated)	1949–50	1950–51	1951–52 (Estimated)
	s d	s d	s d	£ s d	£ s d	£ s d
Newcastle	3 4	6 0	3 0	3 5 8	3 13 8	4 1 4
Leeds	3 1	3 4	4 2	3 15 1	4 2 8	4 13 3
Sheffield	3 4	2 7	3 8	3 3 3	3 8 4	3 17 1
East Anglian	3 0	3 4	5 7	3 7 4	3 15 4	4 0 0
North West Metropolitan	6 2	6 4	4 5	6 17 8	6 12 0	7 5 8
North East Metropolitan	3 10	4 3	5 5	5 8 5	5 10 5	6 10 8
South East Metropolitan	4 9	4 8	4 11	5 5 4	5 16 9	6 7 7
South West Metropolitan	5 0	5 1	5 6	6 1 4	6 5 5	6 19 4
Oxford	4 2	4 5	5 6	4 0 11	4 14 9	5 3 2
South Western	4 3	4 11	3 10	4 9 2	4 18 2	5 9 3
Wales	2 9	3 2	5 1	3 10 6	4 0 1	4 8 8
Birmingham	4 3	2 10	3 4	3 9 7	3 16 1	4 5 4
Manchester	2 9	2 0	3 4	3 9 2	3 15 0	4 3 0
Liverpool	3 7	4 4	4 6	4 7 0	4 10 3	5 5 2

(Note: The above figures are based on the estimated population of each region at mid 1950.)

TABLE II—EXPENDITURE BY HOSPITAL AUTHORITIES IN SCOTLAND PER HEAD OF ESTIMATED POPULATION

Region	Capital expenditure per head of population			All other items of hospital expenditure per head of population		
	1949–50	1950–51	1951–52 (Estimated)	1949–50	1950–51	1951–52 (Estimated)
	s d	s d	s d	£ s d	£ s d	£ s d
Northern	12 8	14 6	15 6	5 0 1	5 15 0	6 7 0
North Eastern	5 6	8 4	10 1	4 6 5	4 10 2	5 5 4
Eastern	7 6	11 5	13 7½	6 3 6	7 3 4	7 17 0
South Eastern	6 6	6 0	10 0½	4 0 7½	6 4 0½	6 0 4½
Western	5 8	6 1	6 11	4 16 1	6 6 11	5 11 7

The population for the three years has been taken on the 1951 census. The figures represent actual expenditure.

It is against this background that one must view the suggestion in the second annual report of the Newcastle regional hospital board that the Newcastle region is getting about 23% less than its proper share of what the nation spends on hospital services. The allocations to regions have inevitably been related to the state of the hospitals of the region when they were taken over. Since that time the specialist services have developed rapidly: in Newcastle within three years, the specialist and registrar staffs have expanded "from about 35 per cent to about 70 per cent of that required for a first-class hospital service."[1] But everywhere the rate of expansion has been limited by lack of new buildings. If a previously backward district hospital is to provide a complete specialist service it needs new or enlarged outpatient, pathology, and radiology departments; and the supply of steel and bricks and mortar has lagged behind the supply of trained specialists. (An exception must be made for certain branches of medicine, such as psychiatry and pædiatrics, in which, in the Newcastle region at least, the factor limiting development has been the shortage of doctors with suitable experience.) It might be fair to say that the contention of the senior administrative medical officer, Dr W. G. Patterson, that Newcastle is getting less than its proper share is fundamentally correct but does not apply to the present situation, in which his board, if they had more money, would still be prevented from building And here it may be remarked that the allocations for Scottish regions (table II) are unexpectedly large One wonders why capital expenditure should be between two and three times higher in Scotland than in her southern peninsula

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[1] Patterson, W. G. *Brit. med. Bull.* 1951, 8, 80.

In general the figures show that very large additional sums would be required even to bring the Provincial to the level of the Metropolitan regional hospital services, without allowing for much-needed development in the Metropolitan regions themselves In such a New Year as this it would be idle to suppose that another £20 million or so will soon be forthcoming for the purpose What is unfortunately more likely is that inflation will *reduce* by some such large amount the buying-power of the £400 million which the taxpayer at present allots to the National Health Service Equalisation by levelling down rather than levelling up may be the prospect we shall have to face

With its income fixed, and its expenses always rising, the service is necessarily in danger of lowering rather than raising its standards One way of avoiding this calamity would be to make its benefits less comprehensive—by abolishing, for instance, free dental care for adults, or by imposing a lodging charge for patients in hospital Such changes may or may not be desirable in the circumstances, but, as they are a means of collecting more money from the citizen for the service, and incidentally necessitate the introduction of a means test, the decision is one for Parliament Within the service, the most important means of economy, in the long run, lies in a gradual shift of emphasis towards simpler measures wherever they will give equally good results the patient should not be kept in a major hospital at £20 a week if he will do as well in a less elaborate one at £10 or in an annexe or hostel at £5, he should not be in any kind of institution if, with suitable aid, he can equally well be at home under his family doctor, and he should not be ill at all if his illness can be prevented by fuller use of what we know of preventive medicine But this policy, even if we begin to apply it at once, will make little difference for a long time, and there is evident need of action now, if we are to preserve the essentials of good medical care in this country during the next few years Dr PATTERSON is right when he says

> “ one of the main needs of hospitals in the National Health Service is the development in the expanded specialist staff of an administrative conscience in money matters which will take the place of the former control of the medical administrator in the municipal health service, or of the medical committee which worked so efficiently in many voluntary hospitals ” [1]

But the necessity for an administrative conscience does not end with specialists for, human nature being what it is, there can be hardly anybody connected with the service—patient, doctor, nurse, or porter—who does not sometimes casually waste a little of its strictly limited resources The best hope of keeping up the strength of the N H S in 1952 seems to lie in everybody's nature becoming, in this respect, distinctly less human, and this is desirable (though no doubt in varying degrees) in London, Newcastle, and Edinburgh alike

Hepatotropic Virus

THE disease now known in this country as infective hepatitis and in the United States as viral hepatitis has had a long and interesting history An epidemic form of jaundice was a scourge of armies in Napoleon's time, and what was called “ contagious jaundice ” took severe toll of the Union forces during the American Civil War COCKAYNE [1] in 1912 recognised that this military disease was the same as a civilian one which he termed “ catarrhal jaundice ” and distinguished clinically from Weil's disease and other icterogenic conditions Epidemic catarrhal jaundice seriously handicapped British forces in the Gallipoli campaign of 1915, but it was not, like Weil's disease, a major problem of the trench warfare in France In 1927 there appeared the report [2] of the first official investigation of outbreaks of “ epidemic catarrhal jaundice ” among British civilians At that time it was thought that this form of jaundice arose from inflammatory obstruction of the bile-ducts associated with gastro enteritis, but in 1930 RICH [3] pointed out that inflammatory change in the liver was the chief post-mortem finding By 1939 many biopsy examinations in this disease had all shown liver damage, and it was also established that during epidemics patients without jaundice might have similar hepatic changes As a result the name “ infective hepatitis ” soon came into general use, and the older term “ catarrhal jaundice ” was more or less discarded

Infective hepatitis appeared as a regular camp-follower on both sides during the fast-moving Mediterranean campaigns of 1940–43, and throughout the war the disease was prevalent among troops returning to this country from the Middle East There was also about 1942 an epidemic prevalence among civilians in certain parts of this country In 1943 the Medical Research Council set up a jaundice committee with Prof L J WITTS as chairman This committee organised special studies on infective hepatitis in East Anglia by a team of research-workers based on Cambridge, and a report [4] on this team's activities during the years 1943–47 is published this week

Most of the civilian patients studied by the Cambridge workers were found with the assistance of the Jaundice Regulations made by the Minister of Health in November, 1943, by which any case of “ catarrhal jaundice, acute inflammation of the liver, acute necrosis of the liver, toxic jaundice, or infective jaundice ” was made compulsorily notifiable within an East Anglian area which contained a population of just over $2^1/_2$ million, of whom about 1 million lived in rural districts This is the first example of the use primarily for medical research of the powers which the Minister has under section 143 of the Public Health Act, 1936, to make any endemic disease compulsorily notifiable The team also studied about 2000 Service cases of infective hepatitis Among these patients were a few with the condition known as homologous-serum hepatitis which, though epidemic logically distinct from infective hepatitis, closely resembles it clinically The report contains in consequence some valuable observations on the possible relation between these two hepatic disorders

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[1] Cockayne, E A *Quart J Med* 1912, 6 1

[2] Morgan, M T, Brown, H C Reports on Public Health and Medical Subjects, no 42 H M Stationery Office 1927

[3] Rich, A R *Bull Johns Hopk Hosp* 1930, 47, 338

[4] MacCallum F O, McFarlan, A M, Miles, J A R, Pollock, M R, Wilson, C Infective Hepatitis Studies in East Anglia during the Period 1943–47 *Spec Rep Ser med Res Coun, Lond* no 273 H M Stationery Office Pp 144 4s 6d

In England as in other countries infective hepatitis is least prevalent in summer, and usually the incidence rises to a peak in autumn and early winter; the incidence is highest among school-children and young adults. An incubation period of 20–40 days is usual and infectivity appears to be greatest at the onset of symptoms; there is however, some evidence for a short period of infectivity early in the incubation period Dr A M McFARLAN concludes in the epidemiological section of the report, that the most probable mode of spread is contact both pharyngeal secretions and fæces being infective He also thinks that human carriers are concerned in transmitting the disease

In the clinical section Prof CLIFFORD WILSON says that there was no evidence among the 2000 military cases he studied for the contention that catarrhal jaundice is a clinical entity which can be separated from infective hepatitis He did not find that sporadic cases in England either had different symptoms or were less severe than epidemic cases among Servicemen from abroad Although one symptom is a dislike of greasy foods there did not seem to be any therapeutic virtue in a low fat diet.

The biochemical investigations by Dr M R POLLOCK showed that liver function was usually deranged from shortly after the onset of symptoms—which in some cases was 10 days or so before the appearance of jaundice Serum bilirubin and urinary urobilin plus urobilinogen were however within normal limits until 2 or 3 days before jaundice appeared A notable conclusion from this part of the investigations is that HUNTER's simple but sensitive test for bilirubinuria, which can be used for the detection of liver damage in the absence of jaundice is of considerable value in investigating contacts or suspected cases during epidemics

The hæmatological section by Dr J A R MILES gives the results of white-cell counts on 30 cases of infective hepatitis in the pre-icteric stage of the disease where hitherto the blood picture has been uncertain Leucopenia, neutropenia and slight lymphopenia with relative monocytosis and an occasional excess of plasma cells were observed A complete follow through of the white-cell count together with observations on hæmoglobin level erythrocyte-count, sternal marrow, and erythrocyte-sedimentation rate was done in 80 Service cases. In this series anæmia very rarely developed and the only abnormality of the sternal marrow was an increase in plasma cells. The erythrocyte-sedimentation rate was raised in about half the cases.

The section on serological investigations, also by Dr MILES gives the results of complement fixation tests with sera from acute and convalescent cases using as antigen saline extracts from fatal cases. Similar tests were made with extracts of the livers of fatal cases of homologous-serum hepatitis and so-called arsenotherapy hepatitis. The results suggested that the cause of infective hepatitis differed from that of these other two forms of hepatitis.

In the section on transmission experiments Dr F O MACCALLUM, although obliged to record mainly negative results, gives an extremely interesting review of the evidence for the belief that infective hepatitis is a virus disease He was unsuccessful in all his attempts to transmit infective hepatitis to normal animals; in this kind of experiment he did however obtain a partial success, which he was unable to repeat, with material from human ases inoculated into rats kept on a low protein diet. volunteers nasal and oral administration of fæcal pensions from cases of infective hepatitis transmitted disease as did inoculations of serum Homologous n hepatitis was not transmissible by nasal or oral ministration of serum which would cause the disease en injected The agent causing this form of hepatitis does not appear to be present in the fæces.

Dr MACCALLUM discusses impartially the evidence for the view that there are two hepatotropic virus agents—A and B—the former being the cause of infective hepatitis and the latter of homologous-serum hepatitis. He suggests that there may be a reservoir of virus-A infection in people susceptible to the naturally transmissible disease infective hepatitis but finds it much more difficult to account for the apparent persistence of a human reservoir of virus B infection this as far as is known at present, is transmissible only by artificial procedures such as blood transfusion and injection He states quite frankly that the experiments recorded in this study leave the problem of the derivation of virus B and its relation to virus A completely unsolved

It may seem to readers of the epidemiological section of this report that the careful field investigation of infective hepatitis which it records has yielded evidence regarding modes of spread which closely resembles that from similar investigations of poliomyelitis The cause of infective hepatitis is almost certainly, as with poliomyelitis, a virus and in both diseases the infective agent is invariably present in the stools of clinical cases and sometimes in those of convalescents Healthy *carriers are suspected of* having a part in the transmission of both diseases and in both the reservoir of infection is probably exclusively human Notwithstanding the common presence of causative virus *in human fæces, water borne or milk* borne outbreaks of either disease are exceptional and in both diseases spread appears to be mainly by what is loosely termed human contact The lack of a susceptible laboratory *animal makes infective hepatitis* even less amenable than poliomyelitis to experimental investigation, and unfortunately in the former disease this difficulty can be lessened only slightly by the use of volunteers It is perhaps comforting to find from the clinical section of this report that infective hepatitis is hardly ever fatal, and that recovery from it, though sometimes delayed, is nearly always complete

Growth Hormone and Carbohydrate Metabolism

THE production of diabetes in normal animals by the administration of growth promoting extracts of the anterior pituitary gland was first reported by H M EVANS and his colleagues[1] from California, in 1932 They had been giving puppies growth promoting extracts in attempts to obtain giants and after continuing with daily doses for 6–9 months they found that some of the dogs had developed diabetes and remained diabetic without further pituitary treatment Meanwhile HOUSSAY and BIASOTTI[2] in the Argentine had rendered both normal and partly depancreatised animals diabetic in a few days by treating them with crude anterior pituitary extract. Prof F G YOUNG, who summarises these earlier observations in his Ringer memorial lecture[3] then began the long series of experiments in which he consistently induced diabetes in intact cats and dogs by giving them short courses of crude pituitary extracts[4 5] Ferrets behaved in the same way, but the usual noncarnivorous laboratory animals—rats, mice, guineapigs, and sometimes rabbits—were unaffected even by the most potent extracts obtainable Later, when they could use a purified growth hormone YOUNG's group produced a substantial glycosuria in intact adult cats with a dosage of less than 1 mg daily per kg of body weight[3] correct but does not apply to the present situation, in which his board, if they had more money, would still be prevented from building And here it may be remarked that the allocations for Scottish regions (table II) are unexpectedly large One wonders why capital expenditure should be between two and three times higher in Scotland than in her southern peninsula

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[1] Evans H M, Meyer K, Simpson, M E, Reichert, F L. *Proc Soc exp Biol* N Y 1932, 29 857

[2] Houssay, B A, Biasotti A *Endocrinology* 1932 16 511

[3] Young F G *Brit. med J* 1951, ii 1167

[4] Young F G *Lancet*, 1936 ii, 297

[5] Young F G *Ibid*, 1937 ii 372.

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[3] Rich A R *Bull Johns Hopk Hosp* 1930 47 338

[4] MacCallum, F O McFarlan A M, Miles J A R Pollock, M R Wilson C Infective Hepatitis Studies in East Anglia during the Period 1943–47 *Spec Rep Ser med Res Coun, Lond* no 273 H M Stationery Office Pp 144 4s 6d

In England, as in other countries infective hepatitis is least prevalent in summer and usually the incidence rises to a peak in autumn and early winter the incidence is highest among school-children and young adults. An incubation period of 20–40 days is usual and infectivity appears to be greatest at the onset of symptoms; there is however, some evidence for a short period of infectivity early in the incubation period Dr A M McFARLAN concludes, in the epidemiological section of the report that the most probable mode of spread is contact both pharyngeal secretions and fæces being infective He also thinks that human carriers are concerned in transmitting the disease

In the clinical section Prof CLIFFORD WILSON says that there was no evidence among the 2000 military cases he studied for the contention that catarrhal jaundice' is a clinical entity which can be separated from infective hepatitis. He did not find that sporadic cases in England either had different symptoms or were less severe than epidemic cases among Servicemen from abroad Although one symptom is a dislike of greasy foods there did not seem to be any therapeutic virtue in a low fat diet

The biochemical investigations by Dr M R POLLOCK showed that liver function was usually deranged from shortly after the onset of symptoms—which in some cases was 10 days or so before the appearance of jaundice Serum bilirubin and urinary urobilin plus urobilinogen were however, within normal limits until 2 or 3 days before jaundice appeared A notable conclusion from this part of the investigations is that HUNTER's simple but sensitive test for bilirubinuria which can be used for the detection of liver damage in the absence of jaundice, is of considerable value in investigating contacts or suspected cases during epidemics.

The *hæmatological section* by Dr J A R MILES gives the results of white-cell counts on 80 cases of infective hepatitis in the pre-icteric stage of the disease where hitherto the blood picture has been uncertain Leucopenia, neutropenia, and slight lymphopenia with relative monocytosis and an occasional excess of plasma cells were observed. A complete follow through of the white-cell count together with observations on hæmoglobin level erythrocyte-count sternal marrow, and erythrocyte-sedimentation rate was done in 80 Service cases In this series anæmia very rarely developed and the only abnormality of the sternal marrow was an increase in plasma cells. The erythrocyte-sedimentation rate was raised in about half the cases.

The section on serological investigations also by Dr MILES, gives the results of complement fixation tests with sera from acute and convalescent cases, using as antigen saline extracts from fatal cases. Similar tests were made with extracts of the livers of fatal cases of homologous-serum hepatitis and so-called arsenotherapy hepatitis. The results suggested that the cause of infective hepatitis differed from that of these other two forms of hepatitis.

In the section on transmission experiments Dr F O MACCALLUM, although obliged to record mainly negative results, gives an extremely interesting review of the evidence for the belief that infective hepatitis is a virus disease He was unsuccessful in all his attempts to transmit infective hepatitis to normal animals in this kind of experiment he did however obtain a partial success, which he was unable to repeat, with material from human cases inoculated into rats kept on a low protein diet. n volunteers nasal and oral administration of fæcal spensions from cases of infective hepatitis transmitted disease, as did inoculations of serum Homologous m hepatitis was not transmissible by nasal or oral inistration of serum which would cause the disease en injected The agent causing this form of hepatitis does not appear to be present in the fæces

Dr MACCALLUM discusses impartially the evidence for the view that there are two hepatotropic virus agents—A and B—the former being the cause of infective hepatitis and the latter of homologous-serum hepatitis. He suggests that there may be a reservoir of virus-A infection in people susceptible to the naturally transmissible disease infective hepatitis but finds it much more difficult to account for the apparent persistence of a human reservoir of virus B infection this as far as is known at present is transmissible only by artificial procedures such as blood transfusion and injection He states quite frankly that the experiments recorded in this study leave the problem of the derivation of virus B and its relation to virus A completely unsolved

It may seem to readers of the epidemiological section of this report that the careful field investigation of infective hepatitis which it records has yielded evidence regarding modes of spread which closely resembles that from similar investigations of poliomyelitis The cause of infective hepatitis is almost certainly, as with poliomyelitis, a virus, and in both diseases the infective agent is invariably present in the stools of clinical cases and sometimes in those of convalescents Healthy carriers are suspected of having a part in the transmission of both diseases and in both the reservoir of infection is probably exclusively human Notwithstanding the common presence of causative virus in human fæces, water borne or milk borne outbreaks of either disease are exceptional and in both diseases spread appears to be mainly by what is loosely termed human contact The lack of a susceptible laboratory animal makes infective hepatitis even less amenable than poliomyelitis to experimental investigation and unfortunately in the former disease this difficulty can be lessened only slightly by the use of volunteers It is perhaps comforting to find from the clinical section of this report that infective hepatitis is hardly ever fatal and that recovery from it, though sometimes delayed is nearly always complete

Growth Hormone and Carbohydrate Metabolism

THE production of diabetes in normal animals by the administration of growth promoting extracts of the anterior pituitary gland was first reported by H M EVANS and his colleagues [1] from California in 1932 They had been giving puppies growth promoting extracts in attempts to obtain giants, and after continuing with daily doses for 6–9 months they found that some of the dogs had developed diabetes and remained diabetic without further pituitary treatment Meanwhile, HOUSSAY and BIASOTTI [2] in the Argentine had rendered both normal and partly depancreatised animals diabetic in a few days by treating them with crude anterior pituitary extract. Prof F G YOUNG, who summarises these earlier observations in his Ringer memorial lecture,[3] then began the long series of experiments in which he consistently induced diabetes in intact cats and dogs by giving them short courses of crude pituitary extracts [4 5] Ferrets behaved in the same way, but the usual noncarnivorous laboratory animals—rats, mice, guineapigs, and sometimes rabbits—were unaffected even by the most potent extracts obtainable Later, when they could use a purified growth hormone, YOUNG's group produced a substantial glycosuria in intact adult cats with a dosage of less than 1 mg daily per kg of body weight [5]

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1 Evans H M, Meyer K, Simpson M E, Reichert F L *Proc. Soc exp Biol, N Y* 1932, 29 857

2 Houssay B A, Biasotti A *Endocrinology* 1932 15 511

3 Young F G *Brit med J* 1951, ii, 1167

4 Young F G *Lancet*, 1938 ii, 287

5 Young F G *Ibid* 1941 ii, 372

curious loss of about ½ lb a day in weight in his second course of hormone and for a few days afterwards, in spite of his greater caloric intake and the authors raise the possibility that this loss the slight fever that accompanied it, and the disappearance of hypoglycæmia, may all be manifestations of hypersensitivity Conn and Louis[8] noted precisely the opposite effect in two patients with organic hyperinsulinism treated with more crude pituitary extracts, both showing a prompt further fall in blood sugar without any intervening hyperglycæmia They even suggested that some forms of human diabetes and of organic hyperinsulinism have a common basis in oversecretion of growth hormone hyperinsulinism representing the exceptional response in man to the insult that more commonly produces diabetes Claims have also been made that A.C.T.H. relieves hyperinsulinism,[23] and the improvement is said to continue beyond the treatment period

These successes of hormone therapy are instructive, but it is not yet a reasonable alternative to surgical removal in cases of islet cell tumour, especially as these are sometimes malignant Nor can we yet regard either growth hormone or A.C.T.H. as an important ætiological factor in the general run of human diabetes

Femoral Head Prosthesis

THE more or less unsatisfactory solutions that the orthopædic surgeon has been able to offer to the problem of irreversible joint disease are well illustrated in the case of the hip[24] He can accept the situation (*if his patient will do so*) he can by pass the diseased area by performing displacement osteotomy he can resect the head and neck of the femur leaving a pseudarthrosis which can be stabilised, if necessary, by abduction osteotomy[25] or he can fuse the joint These several procedures reflect the surgeon's wish to preserve one or more functions with certainty, even at the expense of others fusion secures stability and painlessness, but movement is lost, pseudarthrosis achieves movement at the cost of stability Pain is the cardinal indication for operation, and when pain is severe and the patient is unable to tolerate major surgery and its postoperative régime, denervation by TAVERNIER's method,[26] and even cordotomy, have been tried But they are far from certain to make the patient's life more comfortable

The ideal of regaining or retaining each of the three essentials of a normal hip—mobility painlessness and stability—seemed to come within sight when SMITH PETERSEN introduced Vitallium cup arthroplasty This operation interferes little with the normal architecture of the part, and the forces transmitted across the interposed cup produce congruous remoulding of head and acetabulum with restoration of articular cartilage. But in cup arthroplasty, unlike most orthopædic operations where timing is more important than technique, much depends on surgical skill and subsequent reablement It is not an operation for the busy city hospital, where its results may be only mediocre Moreover vitallium, though electrolytically inert, may provoke enough fibrosis and new bone formation to cripple function This is not to decry the superlative results achieved by SMITH PETERSEN himself and by such disciples as W. A. LAW in this country but we still need methods that will give equal success to the less expert surgeon To this end, in recent years, the brothers JUDET[27] [28] in Paris have popularised a method of arthroplasty in which *the entire femoral head is resected and replaced by a prosthesis of an acrylic resin* ('Perspex') with a steel core This is shaped like a mushroom, with a short collar fitting closely over the neck stump and a stem that is hammered down the femoral neck to emerge below the great trochanter —like a Smith Petersen pin in reverse Such operations have been made possible only by post-war developments in the use of plastics to replace living materials—an advance of which the orthopædic surgeon has taken special advantage[29]

The Judet operation is suitable for three main groups of hip disorder—congenital dislocation, osteoarthritis, and fractures of the femoral neck—and in the autumn British surgeons were able to hear Dr ROBERT JUDET discussing its place in treating these different conditions.

At the Institute of Orthopædics in London on Oct 22 he spoke of the treatment of old, unreduced *congenital dislocations* by this method of resection and reconstruction and showed that the operation is simple in anterior displacements but often difficult in the posterior type One should never operate except for pain, *surgeons who operate for other reasons are likely to regret it*; and so are their patients. A limp alone is no indication for some limp always remains after operation and a painless hip may become painful for the first time, nor is operation advisable to increase movement for mobility is often greater in the dislocated than in the normal hip *It is a mistake to be too ambitious and* attempt to replace the head in the original acetabulum, a new socket in the region of the anterior inferior spine is easier to make and will undo the old compensatory lordosis. Penetration of the inner table of the ilium in making this socket is no cause for alarm for if the bone fragments are packed deep to the acrylic head on the pelvic fascia they fuse and mould into a satisfactory deep socket of the type seen in acetabular protrusion Nothing is known of the late results of these operations, for none have been done more than five years ago Careful *selection is imperative, and for the congenital* subluxation with osteo-arthritis the classical shelf operation is better

At the Edinburgh meeting of the British Orthopædic Association[30] Dr JUDET referred to the treatment of *chronic arthritis* Pain remains the principal justification for surgery; and since the final result is much the same whatever the starting point the *cases on which* to operate are the worst ones, in which the possible improvement is greatest Less gain is to be expected in less severe cases, though this must be balanced against the greater recuperative powers of a patient whose muscles are still in good shape The femoral head is often mushroomed over the neck in these patients, and resection at the apparent cervico-capital junction may therefore leave a very short stump; so it is wise to begin by very conservative resection through the head itself

For *fractures* the classical pinning is still the method of choice whenever there is a chance of bony union—i.e. in the ordinary transcervical fracture A prosthesis can always be inserted later if *non union or avascular necrosis make it necessary* But there is a very definite place for resection reconstruction as the primary treat-

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[23] McQuarrie I., Bauer E. G., Ziegler M. R., Wright, W. S. *Proc. Soc. exp. Biol., N.Y.* 1949 71 555

[24] Meeting of section of orthopedics reported in *Proc. R. Soc. Med.* 1945 38 363.

[25] Batchelor J. S. *Postgrad. med. J.* 1948 24 241

[26] Tavernier L., Godinot, C. Traitement chirurgical de l'arthrite sèche de la hanche Paris 1943.

[27] Judet, J., Judet R. *J. Bone Jt Surg* 1950 32B 166

[28] Judet J., Judet, R., Lagrange J., Dunoyer J. *Mém. Acad. chir. Paris* 1951 77 352

[29] Meeting of section of orthopedics of the Royal Society of Medicine reported in *J. Bone Jt Surg* 1951 33B 403

[30] *Lancet* 1951 ii, 816

INFECTION IN SANATORIA

FROM time to time tuberculous patients or their relatives ask about the possibility of further infection in hospital or sanatorium. There is no direct evidence with which to answer this question. Indeed such evidence would be difficult to obtain, for it would be necessary to treat a ' control ' group under institutional conditions in strict isolation from all other patients—administratively well nigh impossible. Comparison of groups of similar cases under domiciliary and institutional treatment might be of some value, but factors other than further infection would be involved, including psychological factors and selection of patients with better home conditions for domiciliary treatment.

The nearest approach to an investigation on these lines is that by Canetti and Robert[1] in France, who followed the subsequent relapse-rate of medical students discharged as cured from the Sanatorium des Étudiants. They divided their material into two groups, each larger than 100, according to whether the students who qualified became phthisiologists or went into other branches of medicine; the groups were found not to differ in regard to social status or to a number of details concerning their original illness. The relapse-rate was twice as great in the phthisiologists (3·5 per 100 observation years) as in the non-phthisiologists (1·75 per 100 observation years); and this is attributed to the much greater opportunities for infection in those practising among the tuberculous. Nevertheless this does not solve the problem of the effect of superinfection during treatment, for Canetti and Robert exclude relapse within two years of discharge from the sanatorium. According to some physicians there is no problem: in their view superinfection plays no part in the development of tuberculosis and therefore could have no influence on the established case; the course of the illness would depend solely on the patient's resistance. Even those who believe that superinfection plays some part in the pathogenesis of tuberculosis concede that superinfection is of little importance in the active case. A patient with active tuberculosis must have within his body a very large number of living bacilli, even if his sputum is negative, and the addition of the relatively small number of bacilli that can be inhaled would presumably have little influence, provided that the strains of the bacillus were of roughly equal pathogenicity. There is no evidence of widely varying pathogenicity in strains infecting man.[2]

In general, then, there seems no ground for fearing the results of cross-infection between active cases of pulmonary tuberculosis, but two possibly dangerous situations deserve special consideration. Should the time again come when patients can be admitted without delay to tuberculosis wards, some precautions might be necessary to avoid the admission of any of the increasing number of tuberculin-negative young adults with a condition mimicking tuberculosis—for example, virus pneumonia. The safeguard would be to insist on either a positive sputum or a positive tuberculin test before admission. The other possible risk concerns the development of resistant strains of organism as a result of chemotherapy. There is no great danger in the untreated sputum-positive new admission infecting those at the end of treatment, as suggested by a correspondent this week, for the organisms will be overcome as was the original infection; but there would appear to be possible danger to new admissions superinfected with resistant organisms from patients who have received a course of chemotherapy without sputum conversion. The risk is probably very slight, but it would be wise not to put together in a two-bed cubicle a patient with resistant organisms and one commencing chemotherapy.

In this connection it would be interesting to know whether there has been any instance of a patient admitted sputum-positive with susceptible organisms subsequently producing resistant organisms without himself having received chemotherapy. Even one such instance would sound an important warning. The possibility cannot be ignored in view of the cases in pre-streptomycin days of patients admitted to adjacent beds, one with pure human-type infection and a second with pure bovine-type infection, who subsequently each had a mixed infection.

NOCTURNAL SYMPTOMS

WHY do some symptoms occur chiefly or exclusively during the night; and does the occurrence of a symptom at this time shed any light on diagnosis and ætiology? In an interesting paper Engel[1] points out that in the ' nocturnal situation ' various factors may help to produce symptoms. The bedroom and bedding with its dust may contain allergens liable to provoke anaphylactic symptoms in the course of the sleeper's lengthy exposure to them. Prolonged recumbency causes muscles to relax and abolishes their protective fixing of joints, thus causing the sudden pains which arouse the patient with rheumatic fever, rheumatoid arthritis, or other joint disease. Compression symptoms from cerebral or spinal tumours may become more severe. Changes take place in the circulation: the intracerebral venous pressure rises, while the return of the venous blood in the lower limbs is promoted, so that œdema may shift from legs to face. With the patient recumbent both halves of the diaphragm are more elevated, which will contribute to respiratory embarrassment. The uniform warmth of the bed often initiates or increases pruritus.

The condition of sleep itself causes many symptoms. The altered cortical activity reflected in electroencephalographic changes may produce epileptic fits when the patient is falling asleep or awakening or during the hours of sleep. Some epileptics, termed ' night fitters ' by Griffiths and Fox,[2] have fits exclusively at night. In general the function of excretory glands is diminished, except for gastric secretion and sweat. The volume and concentration of acid in the fasting nocturnal gastric juice are usually higher in patients with duodenal ulcer than in normal persons,[3] giving rise to the nocturnal pain of duodenal ulcer. The peristaltic action of the gastro-intestinal tract continues in sleep, but intestinal gases are not passed, and with abnormal production of gas the already elevated diaphragm may be displaced even higher and cause distress. Stimuli for opening the papilla of Vater and evacuating the gall-bladder are absent, so biliary stasis may develop and become the starting-point of biliary colic. In the circulatory system the heart-rate slows and the blood-pressure falls, owing to dilatation of the peripheral arterioles. The fall of blood-pressure may be greater in people with essential hypertension than in the normal person, but in malignant hypertension the pressure remains more or less unaltered. The blood-serum pH usually falls below 7·4 as the carbonic-acid content increases, owing to lessened activity of the respiratory centre in the medulla. These visceral changes in sleep are all part of a shift in the balance of forces in the autonomic nervous system from sympathetic to parasympathetic dominance. As Fulton[4] says: ' Sleep is essentially a parasympathetic integration.'

Engel goes on to discuss various individual symptoms. He maintains that ' neurasthenic ' and psychosomatic symptoms do not occur during sleep, but only before falling asleep or just after waking. This mode of distinc-

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1. Canetti, G., Robert, M. *Rev. Tuberc.* 1950, 14, 451.
2. See *Lancet*, 1951, ii, 769.

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1. Engel, O. *Med. J. Aust.* 1951, ii, 657.
2. Griffiths, G. M., Fox, J. T. *Lancet*, 1938, ii, 409.
3. Levin, E., Kirsner, J. B., Palmer, W. L., Butler, C. *Gastroenterologia*, 1948, 10, 939, 952.
4. Fulton, J. F. Physiology of the Nervous System. London, 1943; p. 248.

ment for recent subcapital fractures, where bony union after the best of pinnings is the exception rather than the rule Only too often the dismal sequence—pinning, avascular necrosis, non-union, and removal of the pin—leaves a painful unstable hip in a patient not always fit to undergo displacement osteotomy, and three months of fixation in plaster For established non-union the Judet operation may well become the favoured method One technical difficulty with fractures, new or old, is a short stump, the plastic head is consequently too near the trochanter, reducing the efficiency of gluteal leverage and favouring dislocation Some surgeons use an extended prosthesis to replace the missing portion of the neck, but obviously this can be done only to a limited extent before the mechanics become so unsound that the prosthesis needs attaching to a plate on the outer surface of the upper femoral shaft The JUDETS themselves prefer to rely on the original model inserted in a somewhat exaggerated position of coxa valga

It is far too soon to assess the merits of this new operation, though it seems that in "average" hands the early results are better than those of cup arthroplasty The very virtue of the plastic prosthesis—its complete inertness in exciting tissue fibrosis, which ensures good movement at the hip—is a possible danger where the stem lies in the neck of the femur. Here the fixation is mechanical only and the prosthesis never becomes biologically incorporated in its host Years of weight-bearing might loosen the attachment, and, though this may be of no significance in the elderly, it will make the surgeon hesitate to perform such an arthroplasty in the young or middle-aged. At a time when, as has been remarked,[31] there is a tendency for new orthopædic operations to be given "world premieres" at crowded meetings almost before the stitches have been removed, we must be unusually cautious in our acceptance of novel methods The Judet operation is being widely used in France[32], it is popular in Belgium[33–35], and it shows signs of ousting cup arthroplasty even in the United States[36] Within a few years there will be plenty of material on which to base a more considered opinion

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31 *J Bone Jt Surg* -1951, 33B 279
32 D'Aubigné M, Lance, P *Mém Acad chir Paris*, 1949, 75 661
33 Verbrugge J *Acta chir belg* 1949, 48, 560
34 Massa J *Acta orthop belg* 1951, 17 16
35 Chapchal, G *J Int Coll Surg* 1951, 16, 309
36 MacAusland W R *Surg Gynec Obstet* 1951, 92 513

Annotations

THE PRICE OF HEALTH

THE immense task of the World Health Organisation, the ways in which the work is being tackled, and the benefits which may be hoped for are set out in a mono ph by Dr C-E A Winslow, of Yale University, nsultant in public health to the organisation[1] He ffers some ideas on the best means of providing for the formidable mass of humanity which urgently needs a health service in its widest sense

The most profitable approach, Winslow suggests, is to begin with the *undertakings that offer hope of maximum results at minimum cost* He thinks that a clear demonstration of the tangible economic assets of curative and preventive medicine *on a world wide scale* will bring to W H O the support it needs in fuller measure In some areas it would be wise to concentrate on the provision of safe water-supplies and sanitation, the control of malaria, immunisation against tuberculosis, and the treatment of venereal disease In regions where preventive measures are more firmly established, a sound programme for maternal and child health may offer the best lead Only in those countries where conditions are relatively good would it be advisable to develop the health education services in an effort to promote positive health

"Prevention is not only better than cure, it is cheaper" To assess the true cost of a public-health programme is difficult, and W H O is seeking fuller information, but meanwhile Winslow hazards an estimate of the average cost of a health service likely to produce the best results—namely $2 55 per annum for each person served Areas where serious health problems exist would need to spend more, and others more happily placed could do with less But even though reliable figures are difficult to come by, Winslow's theme that, in hard cash, the price of health is less than the cost of sickness can scarcely be disputed—and this without putting the sum of human misery and suffering in the balance

But is there a more dreadful reckoning to be paid? As Winslow points out, some investigators have been so impressed with *the possible influence of poverty and food scarcity* as to feel that drastic limitations on population offer the only solution They attribute the two world wars to population pressure, and ask whether reduction of deaths does not do more harm than good so long as birth rates maintain or exceed their present level Winslow answers this challenge by saying that "the major effect of the modern public health programme has been to reduce mortality occurring before the *productive period of life*" He *argues that more people* surviving into adult life means a greater productive capacity, and therefore less poverty The potential food-supply of the world, he says, is not governed by some rigid law, modern methods of agriculture and irrigation can and do yield an abundant increase Again, a highly important fact which is often ignored is that increased prosperity is usually (though not always) associated with lower reproductive rates The right attitude, in Winslow's view, is neither the "defeatist man-under Nature concept of human destiny" nor "the equally unfortunate man over Nature philosophy" which often breaks down in practice What we should aim at is a "man with-Nature" approach which should enable our species to control and mould the physical universe for the increase of its health and happiness

Most of us will agree with Winslow that the fear of over-population is not a sufficient reason for failing to prevent preventable disease, but as the means of prevention become more potent we shall have to look further and further beyond the immediate effects of our actions For example, a book by Mr R C Cook, reviewed on p 32, says that in Japan, by immunising millions of Japanese against smallpox, typhus, cholera, typhoid, diphtheria, and tuberculosis, and dusting them with D D T, the Americans reduced the death rate from 29 during the war to 11 4 in 1948, while the birth-rate (according to Mr Cook) rose to 34 8 per 1000 in 1948 Such improvement, though it might be a cause for rejoicing elsewhere, is alarming in the particular circumstances of an island which depends largely on imported food and whose people have little chance of emigrating to a less crowded land Whatever may be for the general advantage of the world, there are grave risks to any confined population which is allowed or encouraged to increase faster than its economic resources, and these risks are not confined to countries a long way away

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[1] ost of Sickness and the Price of Health C E A Winslow n W H O 1951 Pp 94 7s 6d

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[1] Canetti G Robert, M *Rev Tuberc* 1950 14 451

[2] See *Lancet* 1951 ii 769

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The condition of sleep itself causes many symptoms. The altered cortical activity reflected in electroencephalographic changes, may produce epileptic fits when the patient is falling asleep or awakening or during the hours of sleep Some epileptics termed night fitters' by Griffiths and Fox[2] have fits exclusively at night In general the function of excretory glands is diminished except for gastric secretion and sweat The volume and concentration of acid in the fasting nocturnal gastric juice are usually higher in patients with duodenal ulcer than in normal persons,[3] giving rise to the nocturnal pain of duodenal ulcer The peristaltic action of the gastro intestinal tract continues in sleep, but intestinal gases are not passed and with abnormal production of gas the already elevated diaphragm may be displaced even higher and cause distress Stimuli for opening the papilla of Vater and evacuating the gall bladder are absent so biliary stasis may develop and become the starting point of biliary colic In the circulatory system the heart rate slows and the blood pressure falls, owing to dilatation of the peripheral arterioles. The fall of blood pressure may be greater in people with essential hypertension than in the normal person, but in malignant hypertension the pressure remains more or less unaltered The blood-serum pH usually falls below 7·4 as the carbonic-acid content increases, owing to lessened activity of the respiratory centre in the medulla These visceral changes in sleep are all part of a shift in the balance of forces in the autonomic nervous system from sympathetic to parasympathetic dominance As Fulton[4] says: Sleep is essentially a parasympathetic integration '

Engel goes on to discuss various individual symptoms He maintains that neurasthenic and psychosomatic symptoms do not occur during sleep, but only before falling asleep or just after waking This mode of distinction between functional and organic fails to take into account the psychogenic factors in, for example, bronchial asthma, and also the common complaint of the neurotic that he is awakened by anxiety dreams Nocturnal enuresis is conditioned, as Hobhouse[5] points out, by sleep Apart from its interest for the pædiatrician, its onset in adults may be the first sign of organic nervous disease such as tabes, disseminated sclerosis, and chronic meningomyelitis The patient with cardiovascular disease has many nocturnal symptoms The recumbent posture may embarrass his heart action and his breathing, so that he suffers from air-hunger of any severity up to the grave attack of cardiac asthma His congested kidneys work overtime during the night, so he suffers from nycturia—which may be the first sign of incipient cardiac decompensation Lessened irritability of the respiratory centre and increased vagal tone probably play a part in both cardiac and bronchial asthma during sleep Another classical nocturnal symptom is pain from an attack of gout, this is probably associated with the lowered excretion of uric acid during sleep

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[1] Engel, G *Med J Aust* 1951 ii, 657

[2] Griffiths, G M, Fox J T *Lancet* 1938, ii 409

[3] Levin, E, Kirsner J B Palmer W L, Butler C, *Gastroenterologia* 1948 10 939 952.

[4] Fulton J F Physiology of the Nervous System, London, 1943 p 248

In conclusion, Engel remarks that, while symptoms during sleep may be of great diagnostic importance, we are still too ignorant of the pathogenesis of most of them to say why they should be creatures of nocturnal habits

TREATMENT OF STEVENS-JOHNSON SYNDROME

THE severe form of erythema multiforme exudativum known as Stevens Johnson syndrome is now fairly firmly established as a clinical entity It is a febrile illness characterised by purulent conjunctivitis, ulceromembranous stomatitis, ulceration of the genitalia and anus, and a widespread eruption of vesicles, bullæ, and erythematous lesions on the skin, occasionally accompanied by pulmonary consolidation Its average duration is 3–4 weeks, its mortality about 10%, and blindness from corneal ulceration and scarring is the most serious sequel The ætiology is unknown, the most likely suggestions being a virus infection and hypersensitivity to drugs or other allergens Secondary bacterial infection of the lesions is almost inevitable The diagnosis may be puzzling, for it has to be made entirely on clinical grounds and the skin manifestations may closely resemble those of acute pemphigus, bullous impetigo, or the drug rashes.

Treatment has consisted mainly in local and palliative measures Sulphonamides, penicillin, or streptomycin, systemically or locally applied, neither shorten the illness nor diminish its mortality, but they reduce the risks from secondary infection, including that of corneal damage There being no specific remedy, this has seemed a definite indication for giving such drugs More dramatic results were reported with 'Aureomycin' Both Church[6] and Lynas[7] treated one severe case with this antibiotic and noted striking improvement within 12 hours, followed by rapid recovery

Now Dr Wammock and two U S Army colleagues[8] have tried ACTH The patient was a young soldier, who had developed Stevens Johnson syndrome about 15 days before the ACTH was begun The dosage was 25 mg of the hormone eight hourly for two days, and then daily for three days, making a total of 225 mg The symptomatic improvement after twelve hours' treatment was striking, and all his symptoms and fever subsided within 48 hours, by the fifth day he had completely recovered Spontaneous recovery from the syndrome is usually a gradual process, so the rapidity of these changes strongly suggests that ACTH was responsible

If the success of both aureomycin and ACTH is confirmed in further clinical trials some nice points will arise regarding both the ætiology of the syndrome and the mode of action of the two drugs If aureomycin is successful, it will be hard to deny that Stevens-Johnson syndrome is an infection, probably by a virus The rôle of ACTH, with its many actions still incompletely understood, will be more difficult to explain It seems to inhibit the allergic response to various antigens, so it might well be effective if all the manifestations of this syndrome are parts of a hypersensitive reaction to an infective agent

Coming down to brass tacks, how should a case be treated, in the rather dim light of present knowledge? In the cause of research the effects of ACTH should be compared with those of cortisone But the clinician will think it more reasonable to aim further back, hoping that aureomycin will immobilise the unknown causal organism Incidentally, aureomycin is less likely to cause unpleasant side effects and easier to come by than ACTH Since Stevens Johnson syndrome carries a considerable mortality, the practitioner faced with a severe case should lose no time in getting the patient to hospital, where aureomycin can be given without delay

AUTOMATIC ANÆSTHESIA

THE electro encephalographic pattern during anæsthesia has been closely studied[9] Courtin and his associates[10] at the Mayo Clinic observed that there is a constant relation between the EEG pattern and the depth of anæsthesia and thus the levels of anæsthesia have been redefined in terms of the EEG changes As might be expected, the energy output from the brain gradually becomes less as anæsthesia deepens From this starting-point the path of investigation has led to the development of ingenious mechanical and electronic devices, the latest of which maintains anæsthesia automatically[11]

The energy output from an E.E G apparatus is fed into one end of this device At the other end is an anæsthetic machine administering either thiopentone intravenously or ether by inhalation As the energy output from the EEG apparatus increases, more anæsthetic is delivered to the patient, the desired level of anæsthesia can thus be automatically maintained The level can be varied by means of the "attenuation control," which alters the relation between the amount of anæsthetic drug delivered per unit output of energy from the brain The latest report[12] from the Mayo Clinic describes how 50 patients—46 of whom had intra abdominal operations—were anæsthetised by this automatic or 'Servo' apparatus The anæsthetic consisted of nitrous oxide, oxygen, and ether, and the patients were connected up to the servo anæsthetiser after they had been intubated Anæsthesia was stabilised at a level at which the EEG pattern indicated a safe surgical anæsthetic level Respiratory arrest occurred in one case, but in this instance the EEG pattern was clearly not a reliable guide, and the level indicated was far from "safe" A device was therefore incorporated which cuts off the supply of anæsthetic automatically when the respiratory rate or blood-pressure falls below a pre determined level.

These American workers hasten to counter any suggestion that such a complex electromechanical device could replace a competent anæsthetist They suggest that the apparatus may be of value in animal research, when constant levels of anæsthesia have to be maintained for long periods In the clinical field, however, it is possible that when long-continued deep narcosis is required therapeutically the apparatus might be useful but whether any advantage would accrue from dispensing with a skilled administrator is doubtful.

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[5] Hobhouse N Nervous Disorders in Infancy and Childhood London, 1932 p 148

[6] Church V E *Lancet*, 1950 i 281

[7] Lynas M A *Ibid* p 373

[8] Wammock V S Biedermann, A A, Jordan, R S *J Amer med Ass* 1951, 147, 637

[9] Berger H *Arch Psychiat* 1931, 94, 16 Gibbs F A, Gibbs E L, Lennox, W G *Arch intern Med* 1937 60, 154 Faulconer A, Pender J W Bickford, R G *Anesthesiology*, 1949 10 601

[10] Courtin R F Bickford, R G Faulconer, A. jun. *Proc. Mayo Clin* 1950 25 197

[11] Bickford, R G *Electroencephalog clin Neurophysiol* 1950, 2 93

[12] Soltero D E Faulconer, A. jun, Bickford, R. G *Anesthesiology*, 1951, 12 574

COÖRDINATION OF ABSTRACTING SERVICES

In 1947 a special committee was created by Unesco because there seemed to be a prospect of serious duplication of work by two new abstracting organisations, one in England and the other in Holland. Each of these proposed to survey the world literature on all aspects of medicine but whereas the British organisation proposed to publish abstracts of selected papers only, the Dutch intended to be comprehensive. A meeting was called between representatives of these two bodies and of two other senior organisations which publish abstracts related to medicine—namely, *Biological Abstracts* (Philadelphia) and *British Abstracts* (London)—and Unesco and W H O were represented The meeting agreed that a permanent committee should be formed, to include also representatives of the American Medical Association, the Association de l Enseignement médical des Hôpitaux (France), the British Medical Association the *Bulletin de l'Institut Pasteur* (France) the Bureau of Hygiene and Tropical Diseases (United Kingdom) *Chemical Abstracts* (United States) the Commonwealth Agricultural Bureaux (United Kingdom) and the Medical Library Association (United States)

This committee was set up to consider the possibility of coöperation between these bodies. The representatives met in Paris for four days in June, 1949 and discussed very fully the complicated issues brought to light by consideration of the existing and possible future activities of the various abstracting bodies The results[1] were modest The committee urged greater uniformity in the use of technical terms and symbols for units of measurement The attention of abstracting organisations was drawn to the virtues of collaboration—though perhaps not enough attention was paid to the fact that different classes of reader require different abstracts of the same paper and that the editors of the respective abstracting journals are best able to judge what they should publish. A resolution was taken that the committee should continue its work and an executive committee was appointed This executive committee has held later meetings

It is not easy to assess the value of such work It was entirely sensible to explore the possibilities of coöperation between the different organisations, and the personal contacts were valuable and stimulating There may be a place for some such body to initiate and superintend the publication of lists of periodicals and of multilingual medical dictionaries.

COMMONWEALTH EXCHANGE

Many young doctors come from other parts of the Commonwealth to work in our hospitals and to take our examinations It is good to know that they are prepared to journey so far to learn at first hand something of British medicine and surgery and that our postgraduate qualifications are so highly regarded These young men are no ' new hatched unfledged '' students who come in awe and silence They are quick to appraise all the new things set before them to extract their worth and to criticise The more therefore should they see and hear what is best in this country and be given every chance to do the work they wish in the place they wish It would be selfish to exclude them from our hospitals on some scruple that there are not enough jobs to go round In point of fact there is no shortage of junior resident posts—rather the reverse And when the time comes for promotion they may return home or stand in open competition for the higher appointments.

The Commonwealth visitor has come under a variety of arrangements by diverse ways and some who came with no very precise plan have returned home discomfited Probably the difficulties of the expedition deter many from attempting it at all The whole affair would benefit from a little judicious organisation, leading we hope to a regular system of exchange between Britain and her Commonwealth partners The traffic is mostly one-way at present, and that is a great pity from every point of view When a house-physician in Brisbane comes to Manchester for a year could not a casualty officer from Glasgow take his place ? No doubt if the opportunity to travel were freely offered there would be more wanting to come and go than could be accommodated and some process of selection would then be needed More fundamental questions, however are the number and type of the appointments to be included in such a scheme, the hospitals which would take part, and the finance of exchanges—for somebody must pay the fares. In speaking recently about the decision that, after qualification but before registration every doctor shall hold a house-appointment for a year the president of the General Medical Council indicated that the list of hospitals approved for this purpose will include hospitals in other parts of the Commonwealth[1] It would be an advantage if an exchange system were established before the pre-registration year becomes obligatory

We have heard it suggested that a conference of Commonwealth representatives should be called to recommend exactly what should be done Whether this would be useful would depend on how well the ground was prepared for their meeting But certainly if by one means or another the exchange of young doctors can be made not only frequent but positively usual, much will be gained by the profession throughout the Commonwealth.

NEW YEAR HONOURS

Dr H P Himsworth who is created K.C.B., has been secretary of the Medical Research Council since 1949 when he left the chair of medicine at University College Hospital That he should receive so high an honour so early in his new career will not surprise those who know his qualities of mind and heart and will give pleasure wherever he has worked or travelled. Dr Russell Brain being already physician and philosopher poet and president, has scarcely need of further distinction but, if his knighthood is secondary to the esteem of his colleagues it is none the less becoming Prof R A Peters, F.R.S., who is also created a knight has deserved well of his profession because so many of his biochemical investigations have had highly practical medical implications—for example those on the vitamin B complex, on protein loss and replacement, and on dimercaprol (British anti Lewisite) which was discovered by him and his associates at Oxford Dr George Vance Allen who is knighted for his work as vice-chancellor of the University of Malaya is a Belfast graduate who was bacteriologist at Nairobi and at Kuala Lumpur before becoming principal of the College of Medicine at Singapore where he was interned by the Japanese from 1942 to 1945 Major General S R Burston, now promoted K.B.E., was assistant physician and physician to the Royal Adelaide Hospital from 1914 to 1947 but is known most widely as director general of medical services Australian Military Forces during and after the late war Among the many other well-deserved honours listed on p 44, we are happy to note that Dr Peter Kerley and Dr Robert Machray of Westminster Hospital are appointed C.V.O. for their services as radiologist and anæsthetist during the recent illness of H M the King, while Dr C E Drew Mr Peter Jones and Dr C F Scurr become M.V.O.

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[1] Report on the Activities and the Meeting of the Coördinating Committee on Abstracting and Indexing in the Medical and Biological Sciences. Unesco Publication 580 Paris

[1] *Lancet* 1951 ii 1032.

Reconstruction

GENERAL PRACTICE, THE HOSPITALS, AND THE FUTURE*

B Sangster Simmonds
M S Lond , F R C S
CONSULTING SURGEON, WEST LONDON HOSPITAL

How can this country be provided with an adequate and efficient health service, at a cost it can stand? Only, I believe, by better utilisation of its existing resources of doctors, nurses, and hospital accommodation

To supply the whole population with a really good general practitioner service would require, under the present organisation, more doctors than we can have for many years to come Meanwhile, the lines on which modern hospitals have developed, and the strain of contract practice on the general practitioner, have gone far to divorce the general practitioner service from the hospital service The "family doctor" is fast disappearing and general practice is rapidly deteriorating into a sorting machine The hospitals are faced with waiting-lists up to two years or more for their beds, and even emergencies fail to gain admission In many hospitals there is a serious shortage of nurses, and the inducements offered have so far failed to attract enough recruits The demand for outpatient consultations is so great that patients often have to wait several weeks before they are seen

GENERAL PRACTICE

The work of the general practitioners should, I suggest, be organised with at least two objects (1) to enable them to give enough time to their patients, and (2) to enable them to resume their rôle as family doctors in the fullest sense and, at the same time, to bring them into the orbit of the hospital service One of the chief handicaps under which a general practitioner labours is that, besides having too many patients, he has too few facilities for investigating their condition In many cases he requires information from radiography, blood tests, and the more difficult urine examinations, and even from barium meals and other not so simple aids, but he cannot obtain these except by sending his patient to a hospital consultant clinic Much time is involved, and the patient often passes unnecessarily into the care of the consultant This transfer of many of his more important cases from practitioner to hospital contributes in no small manner to the deterioration of general practice

In a clinic with suitable ancillary services, a doctor can deal with more patients in a given time than he can manage in his own consulting room, and it is possible that the first of my two objects may be attained to a great extent through the general practitioner clinics to be provided under the National Health Service Act Something further, however, will be needed if the gap between the general practitioner and the hospital consulting service is to be closed, as it must be if a comprehensive service is to be assured to patients

The link I propose is an intermediate clinic, preferably staffed by registrars These clinics would be in close association with—or better, an actual part of—the general practitioner clinics and the hospital, and the registrars, in addition to other hospital duties, would act as junior consultants in association with whom general practitioners would be able to obtain all necessary hospital investigations To ensure that the radiological and other hospital departments were not overburdened with unnecessary work, the senior of such registrars should have completed his three years as registrar in a major hospital These clinics should also examine material sent up by general practitioners, and someone should be available at the hospital at all hours for making really urgent pathological examinations, with proper safeguards against abuse After the expiration of their period of service some registrars would become consultants, some would become general practitioners, and some might continue as registrars To assist general practitioners still further, residents and students could be attached to them as assistants for a period This would give them time to attend hospital clinics and to follow up their patients in hospital It would also give the residents and students an insight into the work of general practice, and would employ young men and women waiting for hospital posts

THE HOSPITAL BED

The time patients spend in hospital could be considerably reduced by having as many investigations as possible made without admitting them Instead of occupying a bed, many patients could be more economically and just as efficiently investigated in the outpatient department if this were organised as a diagnostic centre The number of consultant sessions would have to be increased so as to reduce the pressure of attendances, and the X ray departments might have to be enlarged A larger number of registrars and house doctors would also be needed Moreover, patients coming from a distance would have to be housed in hotels or apartments, but even this would be less expensive than putting them in hospital beds

There are also other ways in which the occupancy of beds in our major, fully equipped, and costly hospitals could be reduced For instance, in the early part of the late war I was in charge of the surgical unit of a hut hospital of 400 beds, built at a cost of £100 a bed It included an operating theatre, X-ray and pathological departments, and a dispensary It was staffed by members of the honorary staffs of some of the London teaching hospitals, and it did most of the medical and surgical work of the district I submit that a hospital of this type, with an adequate staff, would be completely satisfactory for the treatment of all conditions other than those requiring very complicated investigation and treatment and highly skilled postoperative care—which cases would of course be admitted to the major fully staffed hospitals Many medical cases, and patients with surgical conditions such as hernia or varicose veins, could be treated efficiently in such a simple type of hospital building Many patients are in bed only for a few days and so need little nursing A few fully trained nurses with assistant nurses could care for a large number of patients In Canada assistant nurses, or nursing aids as they are called, are employed much more extensively than in this country This gives a chance to girls with a somewhat less high standard of education They receive three months' preliminary training, followed by three months in hospital (generally not in a teaching or major hospital) They then act as nursing aids on probation in a hospital for six months, and afterwards obtain a Nursing Aid Certificate The wise employment of such nursing aids would go far to solve the shortage of nurses

Again, many medical patients, and surgical patients after operation, need not remain in the major hospitals for more than a short period, after which they are fit for transfer to a less expensive type of institution The investigation into convalescent homes made by King Edward's Hospital Fund for London shows that there are always many empty beds in these homes These empty beds could be used for patients transferred at an early stage from the major hospitals Some of the homes are already quite suitable for such patients, others could easily be upgraded and if necessary additional homes could be provided at a fraction of the cost of building new hospitals or of providing additional beds in existing hospitals

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* Part of a presidential address to the West London Medico Chirurgical Society delivered on Nov 22, 1951 Published by courtesy of the Editor of the *West London Medical Journal*, in which the address will appear in full

A reduction in the number of days that patients occupy beds in the major hospitals would enable a greater number of patients to be admitted each year, and by their early transfer to a much less expensive institution the all-over cost per patient would be reduced The waiting lists for admission to the major hospitals could be reduced considerably if these hospitals were used only by patients requiring the expensive services which they provide other and less expensive institutions being used for patients whose needs are more simple It is not necessary, for example for hernia, tonsils, and many other conditions to be treated in a bed costing £3000 to build and equip and £15 or more a week to maintain It is a waste of public funds to use such beds for simple cases. Much less expensive institutions are required for (1) straightforward medical and surgical cases, (2) continuation cases and convalescents after discharge from major hospitals, (3) the chronic sick, and (4) the aged infirm

Home care is another method by which hospital beds may be saved. It has already proved successful in America, and it is being tried in Britain though on a much smaller scale It is capable of considerable development.

AN EXPERIMENT SUGGESTED

Having in mind the scheme for an experimental health centre now being carried out in Manchester under the auspices of the Rockefeller Foundation and the Nuffield Provincial Hospitals Trust, I suggest that an experiment on somewhat similar lines should be made in a London area. Its objects would be (1) to unite the hospital and general practitioner service under the auspices of a central teaching hospital (2) to eliminate waiting lists by reorganising the use of existing hospital beds (3) to bring general practitioners into the hospital system and provide them with facilities and assistance which will enable them to give efficient service to their patients (4) to train medical students and newly qualified doctors in general practitioner work (5) to extend hospital work towards general practitioner work by providing registrar clinics to which general practitioners have access (6) to overcome the problem of the shortage of hospital beds (7) to employ more efficiently the present number of doctors and nurses and (8) to reduce the all in average cost of treating a patient.

For such an experimental unit we should need

(i) A fully equipped and staffed *general hospital*, comprising a *medical school* for undergraduate and general practitioner postgraduate students.

(ii) An *outpatient department* to act as a diagnostic centre. Here there should be sufficient accommodation and staff (physicians surgeons specialists house-staff and students) to enable all investigations to be completed in the shortest possible time Admission to hospital beds should be limited to those patients whose investigation cannot be completed without observation for several days

(iii) A *registrar consultation clinic* to which general practitioners could bring or send patients who though not requiring specialist investigation, need fuller examination than the general practitioner has time or equipment to undertake

(iv) One or more *general practitioner clinics* with consulting rooms simple equipment and the assistance of students nurses and secretaries Such clinics should be in close proximity to registrar clinics and hospitals.

(v) A *hospital home visiting service* whereby members of the house-staff and students could assist general practitioners in their work especially with visits after the first and calls outside normal working hours thus enabling doctors to attend clinics and/or hospitals regularly

(vi) A *secondary hospital* not necessarily in London with simple equipment, a much smaller proportion of nurses (trained and assistant), and a thoroughly competent though less senior medical staff Here medical, surgical, and specialist patients would be treated for straightforward conditions requiring no complicated investigations or elaborate nursing—e.g , hernias, piles, varicose veins, and simple medical conditions.

(vii) A *continuation hospital* to which patients, although still requiring some nursing, would be transferred a few days after operation. This should be within easy ambulance journey of the parent hospital so that patients could be returned without undue delay should the necessity arise.

(viii) *Convalescent hospitals* Some of the existing ones would be quite suitable ; others could be upgraded.

(ix) An *institution for the chronic sick*, with moderate equipment and a small nursing staff

(x) A *rehabilitation service* including physiotherapy and occupational therapy

(xi) An *institution for the aged infirm*, requiring mainly domestic help and practically no nursing

(xii) One or more *cottage hospitals* simply equipped and with a small nursing staff, where general practitioners could treat patients under better conditions than exist in their own homes.

(xiii) *Curative workshops*, such as are now in use in New York and at Papworth, in which long term partially disabled patients—e g compensated heart and non infectious tuberculosis cases—certified fit to do at least three hours work daily can be employed under ordinary industrial conditions to manufacture goods, for sale in the general markets. (Sheltered workshops for permanently disabled patients who cannot compete in the open labour market, but who can do some useful work and so be less dependent, would also be useful.)

(xiv) *An extension of almoner and social services to* assist general practitioners and patients in their own homes. General practitioners often have great difficulty in placing patients in convalescent homes even though the patients may be willing and able to pay In many other problems these services would be of great assistance to the general practitioners.

(xv) Active tuberculosis, infectious and mental patients would be treated as at present in the appropriate institutions, as would also long term illnesses in children

COST AND PRACTICABILITY

In an organisation such as is proposed a great many more patients could have inpatient treatment in hospitals and allied institutions than is possible at present, and at a much lower cost Exact figures cannot be given but inquiries in America and elsewhere suggest that approximate costs would be as follows :

(a) In the major hospitals	£15 to £20 per patient per week
(b) Continuation hospitals	£4 to £7
(c) Convalescent homes	£3 to £5
(d) Hospitals for the chronic sick	£3 to £4
(e) Institutions for the aged infirm	£2 to £3 „

Though the proposals are revolutionary and long term they are practicable ; indeed there is nothing in them which is not being tried in one place or another here or abroad They would certainly economise in doctors and nurses They would shorten the waiting lists of hospitals They would improve the status of general practice They would reduce the cost per patient of hospital treatment They would also reduce the cost to industry of the long wait for hospital beds by patients who are partially disabled

At first sight it might seem that the employment of more registrars and hospital residents would be very expensive But as all doctors are now paid by the State it would only mean a redistribution and some upgrading so the cost would not really be heavy

There is no reason why an individual hospital such as the West London should not explore the possibilities of making a start A general practitioner and registrar clinic could be built of semipermanent huts, perhaps on a bombed site, not far from the hospital A technician could form the nucleus of at least a twelve-hour pathological service If the X-ray department were unduly strained, the hours of service could be extended by a double shift Extra resident hospital staff could provide a resident and student service to assist and relieve general practitioners All this would fit in with postgraduate training of general practitioners

By reorganisation, with extra staff, the hospital outpatient department could become a real diagnostic clinic By arrangement with suitable convalescent homes a continuation hospital service could be inaugurated, so that by rapid transfer the stay of patients in the main hospital beds would be considerably shortened and the waiting lists worked off.

Other parts of the scheme would take longer to introduce, but if the simpler parts were proved successful, the Ministry of Health might coöperate in organising the remainder

This is but a bare outline, and much detail would have to be worked out I hope, however, that, even if it does nothing else, the scheme will draw attention to some of the problems which have been accentuated but not solved by the National Health Service Act

Special Articles

ADMINISTRATION OF HEALTH SERVICES

W.H O MEETING

THE W H O Expert Committee on Public Health Administration held its first conference at Geneva on Dec 3–7 Dr Karl Evang, director-general of health services for Norway, was elected to the chair, and Dr Ira Hiscock, chairman of the department of public health of Yale University, undertook the duties of rapporteur During the five day session the committee discussed agenda outlined by the secretariat of W H O and prepared a report on the principles of health administration and their application to countries at different economic and social levels

In view of the great variety of services more or less directly related to health the committee drew up a list as a framework within which the provisions of a country could be set, they then studied the distribution and scope of responsibility for health in a country, using for the purpose four broad categories

1 Operational responsibility—the authority provides the funds and itself does the work

2 Policy making and financial aid—to another body which is responsible as agent for carrying out the work

3 Definition and enforcement of minimum requirements, statutory or otherwise, without necessarily undertaking financial commitments

4 Promotion of services by methods of persuasion and education, without imposing financial or legal sanctions

The committee paid special attention to the structure of a decentralised health service, believing that in most countries the local health department should be the basic health service unit

> "A local health department can fulfil its responsibilities most effectively if it operates one or more well equipped health centres providing adequate space for administrative offices, clinic facilities, and classrooms for public and professional instruction In due course these centres will develop facilities for the temporary care of the sick, and for diagnosis "

At all discussions great stress was laid on the integration, at every level of medical care, of general medical practice, the public-health service, and the hospitals Even this was not enough there was an urgent need for the people's understanding of, and participation in, health work Indeed, the crucial tests of an effective service were as stated by Lilienthal[1]. (*a*) do the men and women on the local staffs have the power of decision? and (*b*) do the people, in their private and group capacities, *actively* participate in the enterprise?

Health is a very personal thing, the committee reported, and the people must be interested in the need for a local health administration—an administration containing both experts and citizens at large It is also in this way that a health education programme can be made stimulating and effective

The major problem in almost every country today is the shortage of fully trained health personnel The committee studied the needs of professional and technical staffs and some of the difficult problems of training They noted especially the ever-increasing scope of health administration, and the tendency in many areas to excessive specialisation within the service It was urged that there should be close and frequent consultation between the teaching bodies and the health authorities in order to secure effective coördination of the subject-matter of teaching, and a regular adjustment of the supply of personnel to the needs of the health service Health administrators should take an active part in teaching One session was devoted to the problem of making a career in the health service more attractive, especially in sparsely populated districts—where the difficulty applied with equal force to nurses, engineers, and other health personnel

In considering the financing of health services the committee were fully cognisant of the bewildering variety of methods, even in countries with similar problems, they noted, however, that in most areas health work began as a local responsibility, but as the service grew it became necessary to spread the financial burden over wider and wider areas The difficulties arising from this inevitable trend were the need to retain private effort and interest, and to encourage the people on the spot to take an active part The committee felt that a wide survey of administrative factors would be useful, with the object, among other things, of obtaining comparative figures of expenditure on the health services, both personal and environmental

NEW YEAR HONOURS

THE list of honours published this week contains the names of the following members of the medical profession.

K C B

HAROLD PERCIVAL HIMSWORTH, M.D Lond, F.R.C.P
Secretary, Medical Research Council

K B E (Military)

Major General SAMUEL ROY BURSTON, C.B, C B.E, D S O, M.B Melb, F.R C.P, F R A C P, Australian Military Forces retd

Knights Bachelor

GEORGE VANCE ALLEN, C B E, M.D Belf
Vice chancellor, University of Malaya

WALTER RUSSELL BRAIN, D M Oxfd
President of the Royal College of Physicians of London, physician to the London Hospital

RUDOLPH ALBERT PETERS, M C, M A Oxfd, M D Camb, F R.S
Whitley professor of biochemistry, University of Oxford.

C B (Military)

Major General RODERIC DUNCAN CAMERON, C.B.E., M C, M.B Edin., K.H S

Surgeon Rear Admiral FREDERICK GEORGE HUNT, O.B.E, M B N U.I, K.H.P

C M G

JOHN CATARINICH, M.B Melb
Director of mental hygiene, State of Victoria, 1937–51

WILLIAM ARTHUR EDWARD KARUNARATNE, O B.E, M D Lond, M.R C.P
Professor of pathology, University of Ceylon

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[1] Lilienthal, D E Tennessee Valley Authority Harmondsworth, 1944

C V O

Peter James Kerley O.B.E., M.D. N.U.I., F.R.C.P., F.F.R.
Director of the X ray department, Westminster Hospital
Robert Machray, M.B. Lond F.F.A. R.C.S
Anæsthetist to the Westminster Hospital

C B E (Military)

Air Commodore Edward Alfred Daley, M.D. Melb F.R.A.C.P., R.A.A.F
Surgeon Captain Allan Watt McRorie, M.D. Glasg K.H.P R.N
Air Commodore John Conrad Neely D.M. Oxfd R.A.F
Surgeon Captain Denis Adrian Pritchard M.B B.Sc Sydney M.R.C.P F.R.A.C.P., K.H.P., R.A.N
Group Captain William Kilpatrick Stewart A.F.C M.B B.Sc Glasg., R.A.F

C B E (Civil)

Charles Cameron M.A M.D Glasg., F.R.C.P.E. F.R.F.P.S
Professor of tuberculosis University of Edinburgh
Cuthbert Gaulter Magee, F.R.C.P.E.
Deputy director general of medical services, Ministry of Pensions

M V O

Charles Edwin Drew M.B Lond. F.R.C.S
Chief assistant and surgical registrar Westminster Hospital
Peter Henry Jones F.R.C.S
Surgical registrar Brompton Hospital.
Cyril Frederick Scurr, M.B Lond.
Consultant anæsthetist Westminster Hospital

O B E (Military)

Major John Robertson Nimmo M.B Sydney R.A.A.M.C

O B E (Civil)

(Mrs.) Muriel Helen Deem M.D N.Z.
Medical adviser to the Royal New Zealand Society for the Health of Women and Children (Plunket Society)
Donald Charles Farquharson M.R.C.S
Regional medical officer, Ministry of National Insurance
Manuel Lazarus Freedman M.B
D.M.S., Bechuanaland Protectorate
John McIlrath Gibson M.D Belf
M.O.H. and chief school M.O. for Huddersfield
Alfred Ernest Hallinan M.C M.B Lond.
Regional medical officer Ministry of Health
William Alexander Milne, M.B Glasg
For public and medical services in Greenock
Lieut Colonel Edward George Montgomery M.B Dubl., late I.M.S
Surgeon General East Bengal
Alfred Arthur Edmond Newth M.B Lond
Senior school M.O. for Nottingham.
Victor Emmanuel Perera Senewiratne, M.D Lond. M.R.C.P
Visiting physician, General Hospital Colombo
George Wright Simpson M.A M.D B.Sc Edin.
M.O. and chief inspector of physical education Scottish Education Department

M B E (Military)

Major Robert Goudie Macfarlane, M.B Glasg., R.A.M.C
Lieutenant Harold Stewart Moore M.B Lond., R.A.M.C
Major James Joseph Walsh R.A.M.C

M B E (Civil)

John Campbell Atherley M.B Lpool
Admiralty surgeon and agent Manchester
(Miss) Muriel Josephine Louisa Frazer, M.D Belf M.R.C.P F.R.C.S.I
District surgeon St. John Ambulance Brigade Northern Ireland district
Wilfred Basil Ralph Jones M.R.C.S
M.O. district I Montserrat Leeward Islands.
Ronald Greaves Ladkin D.M Oxfd Colonial Medical Service
M.O., Uganda
William Richard Lawrence M.D
Medical practitioner Te Aroha Auckland New Zealand

The Wider World

THE AMERICAN SCENE

A P Meiklejohn
D.M. B.Sc Oxfd, M.R.C.P

SENIOR LECTURER IN NUTRITION DEPARTMENT OF MEDICINE UNIVERSITY OF EDINBURGH A FORMER PEABODY FELLOW, HARVARD MEDICAL SCHOOL

Last summer with a grant from the Nuffield Foundation, I spent three months in the United States and Canada, studying some trends in medical teaching and research

A short visit of this kind, covering a great deal of country needs careful planning and good prior contacts, so that the right person is seen at a time arranged well in advance But it would be a mistake to think that the journey would be better made slowly Two to three days in each centre is usually all that you can usefully spend on a visit of this kind by staying longer you become a social embarrassment, using up too much of busy people's time Stay three days, or else at least thirty —nothing in between People are delighted to see you for a short stay, and if you go away having failed to see everything it is better than going over the same ground once again while waiting for your appointment at the next place Though they are glad to welcome you they are also grateful when you leave early with apologies. If you come to settle down for a month or more, that is quite another thing you do not have to be looked after all the time

It is important to travel light, especially in summer A heavy British raincoat for instance is a burden on the perspiring arm Travelling fast from place to place, it is troublesome and expensive to get laundry done in a hurry In hot weather you need two clean shirts every day Rather than spend time hunting out inscrutable Chinese laundrymen who might or might not do your washing for you overnight, it is better to invest on arrival in some new Nylon garments. You will need

Two white nylon shirts	18 dollars
Two pairs of nylon pants	6
One pair of nylon pyjamas	12
Three pairs of nylon socks	5 „
A thin plastic rain-cover (takes up little room in a brief-case)	8
	49 dollars

This is a large initial outlay but it is worth it. You save at least this amount in three months, by having no laundry bills—which are astronomic You wash the nylons yourself with toilet soap and a nylon nail brush they dry in a few hours and need no ironing

* * *

This was my sixth visit to America—I had last been there in 1947—and I was agreeably surprised by the social scene.

British opinion about American life depends too much on generalisations extrapolated from impressions gathered in the cities of the North East seaboard How many British newsmen based on New York or Washington have any first hand knowledge of the Middle West South or West? Certainly I found that I had developed a quite wrong impression over the past four years from reading reports on America in British newspapers.

The most striking thing is the enormous vigour and prosperity of contemporary American life The changes that have taken place since I first visited the country fifteen years ago are truly astonishing At that time it seemed as though capitalist society was crumbling *now it has a new lease of life.* Even in the South the privately owned automobile has become almost universal The 4 million citizens of Chicago own among them $2^1/_2$ million motor vehicles Labour saving devices have standards Life for him has now begun in earnest, he no longer plays any games, he feels himself one of a privileged few, lucky to have got in, and, above all, like all Americans, he is interested in things that are new It must be admitted that, just now and then, preoccupation with the new leads to too little attention to old and tried principles, nevertheless it is thus that medicine in America is dynamic, not static

* * *

The most exciting development in teaching that I met was the plan (backed by the Commonwealth Fund) for a new curriculum at Western Reserve University, Cleveland Western Reserve is in a unique position to shake its curriculum apart and reassemble it, because out of twelve heads of departments in the medical school, nine have been replaced since the war Most of them are under 45—and keen

Hale Ham, who is charged with developing the programme, has adopted the sensible policy of making himself chairman of a variety of committees to consider what ought to be taught, and how The responsibility for adopting the committees' recommendations rests with the faculty Some of the features recommended are

The abolition of formal anatomy It will be taught instead, mainly as microscopic anatomy in relation to the physiology of each organ as it is discussed, and later as surgical anatomy—when the spatial relationships of organs acquire some practical significance

The whole of the course will relate, from the beginning, to the problems of the patient At every stage in the four years, a physician will be part of the team

The very first day in medical school, the student will be confronted with something exciting, probably a young diabetic giving himself his own insulin.

Each student will have his own desk, library, and laboratory space which he will occupy the whole four years, the teachers will come to him, rather than he to them

When the student comes to consider, say, the kidney, he will devote the whole of his time for several weeks to it, learning consecutively the views of the anatomist, physiologist, morbid anatomist, chemical pathologist, pharmacologist, and physician The teaching of each viewpoint will be integrated, so there is no overlap, contradiction, or needless repetition.

This is an imaginative project, in my view, long needing trial somewhere Too many committees have pronounced on how to teach medicine, without anything constructive being done If this scheme works, it may stimulate much-needed reform elsewhere It is due to start in October, 1952, and is worth watching

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Points of View

PROPRIETARY PREPARATIONS AND THE N H S

FROM A CORRESPONDENT

THREE years ago the chairman of the standards committee of the Chemists Federation, Mr E W Godding, suggested that "the Ministry of Health has a new responsibility towards the pharmaceutical industry"[1] He pointed out that until the introduction of the National Health Service the substantial part of the population outside the scope of National Health Insurance had made it possible for the industry to follow a vigorous programme of research and development, but this position might be sharply reversed if the policy under N H I. was continued and extended in the new service He concluded that to accept the benefits of the industry's research while denying material encouragement for its continuation was bound to have a distressing effect Conversely, the stimulation of further research and development would contribute much to a vital and progressive health service

COSTS AND POSSIBLE CUTS

The general public, the Ministry of Health, and to some extent the medical profession seem to have the impression that national resources are being drained away in a broadly flowing river by the prescription of proprietary preparations

Let us consider the expenditure on the pharmaceutical service in relation to that on the N H S in general The revised estimate for the pharmaceutical service for England, Wales, and Scotland in 1951–52 is as follows

	£ (*million*)
Payments to pharmacists	
Dispensing fees and rota payments	13 6
Cost of ingredients and allowance for containers	24 5
Allowance for overheads and profits	3 6
Payments to doctors and dentists for the supply and dispensing of drugs &c	1 9
	43 6

From July 5, 1948, to February, 1950, proprietary preparations accounted for 28–29% of the cost of the pharmaceutical service The proportion has increased, largely owing to the introduction of the newer antibiotics and other new drugs No official figure has been published, but it would probably be fair to put the present proportion at 40% By this reckoning the bill to the nation for "ethical" proprietary preparations is

$$\frac{£24\ 500\ 000 \times 40}{100} = £9\ 8\ \text{million.}$$

The Treasury, or the Ministry of Health, might insist that doctors shall not prescribe proprietary medicines, but as many so called proprietaries have no official equivalents (or else no cheaper equivalents) the reduction might amount to no more than a quarter, and the saving would then be

$$\frac{£9\ 800\ 000 \times 25}{100} = £2\ 45\ \text{million}$$

The saving of this relatively small sum would carry with it certain notable disadvantages

1 It would damage research by manufacturing chemists—research which has given the medical profession almost all its new drugs in the last few decades, has certainly saved thousands of lives, and has possibly helped to improve the national health and consequently national productivity.

2 It would give more work to doctors in writing out prescriptions

3 It would create a bad impression among the laity Nothing could be more foreign to the spirit of the National Health Service than the idea that the best medicines are to be available only to those who can afford to consult a doctor practising outside the service (It will be remembered that in the days of N H I the distinction between "panel treatment" and "non-panel treatment" was well marked in the patients' eyes)

4 It would damage a substantial and growing export trade, amounting in 1950 to £22,330,000

A PRESCRIPTION CHARGE ?

If money is to be saved it could be saved by the "shilling on the prescription," unpopular though it might be as a matter of principle Experience with a 6*d* charge in the Isle of Man, and the reaction in Britain at the time when the 1*s* charge was discussed in the House of Commons, suggests that the falling-off in the demand for prescriptions might well exceed 25% A few months' experience of charges for spectacles and teeth has shown what can be achieved in the way of saving If the estimate of 25% is correct, the saving would amount to

$$\frac{£43\ 600\ 000 \times 25}{100} = £10\ 9\ \text{million}$$

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[1] Godding E W *Lancet* 1948, ii, 465

In 1950 approximately 216 800 000 prescriptions were dispensed, and three-quarters of these at *1s* a time, would bring in £8,130 000 Thus a total saving of £10 030,000 would be achieved compared with the £2,450,000 which would be secured by the estimated 25% reduction that would follow an attempt to prevent doctors prescribing proprietary medicines.

For the few who could not afford the *1s* charge assistance should be provided. The charge might help to mitigate if not cure, the bottle-of medicine habit, which is deeply ingrained and is spreading Furthermore, freedom for the doctor to prescribe what he thinks the patient should have would fortify both his own and his patient's morale, while the pharmaceutical industry would be encouraged to make fresh efforts to evolve valuable new preparations

SERVICE BY THE MANUFACTURERS

There is, however another aspect It is well known, of course that manufacturers of proprietary drugs spend a great deal on research It is often alleged, however that they waste money—and indirectly public money—in advertising Yet without advertising the doctor would be in ignorance of the existence and value of the preparations on the market

Doctors are informed of these not only by advertisements in medical journals but by representatives who call and explain the virtues and limitations of a particular preparation for the benefit of those who are too busy or are disinclined to rely on the printed word and prefer to ask questions Manufacturers must also provide brochures, lists of references to publications, dosage tables, suggestions for suitable uses, and a host of detailed information This calls for a highly trained staff of representatives at the periphery and a highly trained medical and literary staff at the base

Considerable judgment is needed to assess the clinical value of preparations and here again specialised staff must arrange for clinical tests sift the resulting information, and decide whether the results merit further action The clinical trials require contact with the relevant branch of the medical profession not a little patience, a certain amount of good fortune and a great deal of organisation

The medical departments of most pharmaceutical firms possess, locked up in their files information covering many products and going back many years. This stock of information will include unpublished reports from experienced and reliable practitioners. The machinery for collecting this information and employing it usefully costs quite a lot of money

Finally the pharmaceutical industry is sometimes criticised for selling things. This criticism does not seem applicable where the public ' is a professional one, highly educated, and for the most part well above average intelligence It is difficult to believe that a medical practitioner's judgment is so uncritical that he will allow himself to be bamboozled by sales propaganda into prescribing for his patients some preparation which will not produce the effects claimed for it

A reputable firm has its reputation constantly at stake; it simply could not afford to risk introducing inferior preparations and furthering their sale by demagogic pronouncements directed at the doctor If a preparation does not ring the therapeutic bell the manufacturer is quick to discard it.

" One task of wise government is to persuade the people that health is worth having that it is worth paying for and that for the most part it is within reach. '—Dr E D IRVINE, medical officer of health for Exeter, in his report for 1950

In England Now

A Running Commentary by Peripatetic Correspondents

WELL, that's Christmas finished with for another year Most of us now accept the meteorologists view that white Christmases are rare in England, but nevertheless pay respect to the traditions initiated by Dickens and since perpetuated by the vigorous propaganda of cards, calendars, and such like knick knacks. Still the premature pictures of snowballing and tobogganing at least remind us to search our wardrobes for thick clothes in wearable condition before winter really comes A more urgent task is to provide the car's radiator with its favourite antifreeze fluid and scrape the rust off the wheel-chains. If one has to travel a lot by road snow is an unmitigated nuisance, whatever the winter-sports enthusiasts may say It is still possible to get snowed up in the middle of the night on Salisbury Plain (as my friend Jones was in 1929); but on the whole winter journeys by road have lost most of the terrors they had in the past In the winter of 1820 some of my forebears moved from "Herts ' to Worcestershire about 100 miles and because of snow the convoy of wagons and carts took six weeks over it The stage-coaches got on much better than wagons in the winter, because the services were well organised and there was intense competition between the owners to get their coaches through on time whatever the cost so the horses were the best money could buy and the vehicles were kept in tip top repair We are apt to think contemptuously of the stage-coaches rumbling along at five or six miles an hour and most people would be astonished by the time-tables on some of the principal routes. For instance, a coach left Piccadilly every day at 5 A.M and reached Exeter at 10 o'clock the same night. All the same travelling by coach was pretty grim, and if you did much of it you had to be tough enough to stand being roasted in summer and frozen in winter not to mention the hours of swaying about in something between a large bathing machine and a very small second-class carriage One of the troubles was to get any meals en route, the coaches never stopped very long at the inns and innkeepers were up to all kinds of dodges—either the soup was too hot to drink or the service was so slow that you were only just starting when the coach horn was sounded and off you had to go. Your meals would then do nicely for the next party of travellers The good old days? I wonder When you are going to Exeter there is much to be said for the 12 noon from Paddington which gets you to St. David's Station by 3 3 P.M.—or a few minutes sooner if you're lucky

* * *

Late in the afternoon the International Health Team arrived in the village No-one was about it was hot fifty yards away under the palm trees we observed a group of men clustered around a small object obviously of absorbing interest. We went over The object was an old whiskey bottle placed upon a packing-case Within the bottle two small fishes were fighting a life and death struggle Some thirty men of all ages the grey heads and the young together squatted round and gazed upon the bottle with breathless attention The contestants were each about an inch and a half long Alone these gladiators are very inoffensive tame fellows But show one of these little fishes a fellow fish! Out spreads a large tail and two big fins, gorgeously fierce in red and blue angrily swishing the water The two in the bottle were evenly matched and fighting gamely They were able to get hold of each other by the jaws and so shake their opponent heavily This happened many times: they broke off: they re-engaged the excitement was intense At last after we had been watching over half an hour and with only four minutes to go to no-side and an honourable draw one of the little fish broke the engagement and retired to the bottom of the bottle leaving his rival undisputed master of the upper waters Elation and consternation among the rival supporters Banknotes changed hands: all talked and gesticulated at once The next contestants were brought forward and inspected There was much discussion: bets were placed the fighters were transferred to a common bottle and another battle began, it was all absorbing Dusk was drawing on, we had an appointment elsewhere and so must leave All we could write in our note-books was " No primary poverty seen "

* * *

As an ordinary overworked chemical pathologist, it was with mixed feelings that I received a bulky package from Mr Eric S, labelled " 2 lb frozen *yeti* urine collected at 21,000 feet on Sept 21 and stored in dry ice " When I rang him up he said No, he did not want the 17-ketosteroids done, but he thought it would interest me since medicine men of various Tibetan tribes used it as a rare and costly treatment for *bahki-lhkhi*, which, he gathered, was the Tibetan form of " collagen and alarm-syndrome diseases " I thanked him cordially and set to with hydrochloric acid and chloroform until to my delight several kilogrammes of glistening white crystals were obtained

On injecting 2 μg into four mice I noted that they fell into coma, but after 3 hours the eosinophils had entirely disappeared from their blood and their livers were converted into solid white casts of pure glycogen After careful calculation I decided a statistical analysis was unnecessary and rushed down to Ward X with loaded syringe and needle I chose a young arthritic with knees like footballs and injected 2 mg intramuscularly In 5 minutes the footballs started to go down with a hissing noise and my patient leapt out of bed, shouting in broad Cockney " That must have been an 11-oxygenated gluco-corticosteroid you gave me ! " He escaped from the ward before I had time to warn him about liver glycogen, but accepting his assurance on the chemical nature of my injection I rang up the Patent Office to apply for protection I should have known better, for I was told they were sorry but my discovery was hardly original, the idea was at least six months old—an American firm had been feeding Mexican yams and strophanthus seeds to a captured *yeti* for the past year and had patented the urinary product, which of course appeared in far greater yield on this diet, under the name of 'Yetisone,' described as "a new and potent anti-arthritic compound " I hung up and cursed my way back to the lab These Americans think of everything

* * *

Our cardiologist (a distinguished contributor to *The Lancet*) recently got into difficulties over a problem which he deemed to be obstetrical. His house-physician had made the common mistake of squeezing a heart removed at necropsy into a jam-jar, letting it lie in formalin for a few days, and then trying in vain to extract it Now this was a valuable heart and perhaps the jam-jar was valuable too, for the cardiologist sent the whole thing to us in the maternity unit with this letter

> " Dear Dr Ammon—Your help with this case of impaction would be appreciated Is forceps delivery indicated ? "

Our house-surgeon, a young lady with very small hands, managed to perform internal version and a successful extraction, so we replied

> " Dear Dr Perry Cardium,—Thank you for referring a highly instructive case to this unit I am happy to say that we effected delivery without rupture the heart was gravely embarrassed because the right chamber was not in use It seems advisable to avoid conceptions of this sort in future "

* * *

Having coped with the requirements of the Central Medical War Committee, H.M inspector of taxes, the local executive council, and the other bodies that plague the modern doctor, I considered myself an adept at form-filling But I was very nearly defeated when faced at 4 A M with this question on the antenatal card of a provincial hospital " Previous pregnancies—reputed cause ? " It took two cups of tea and one of coffee to produce the answer " The usual "

* * *

Heard in the surgery " Sister said she'd have to stop in hospital over Christmas because she's got a temperature from a Pyrex dish of unknown origin "

Letters to the Editor

ECONOMY IN X-RAY FILM

SIR,—At its last meeting members of the Joint Tuberculosis Council expressed their concern about the shortage of X ray film

The manufacturers assure us that output continues at maximum level, but an export quota has to be met before the home market can be supplied. This export quota may amount to as much as a quarter to a third of the total output If we were engaged in a non-essential industry we might fairly be expected to accept this, but the maintenance of the health of the population is fundamental to the satisfactory carrying on of all the other industries in these times of shortage of man-power

We know that difficulty in obtaining supplies is already interfering with the work of some chest clinics and sanatoria It will take only a slight further deterioration in the situation to bring about a widespread dislocation in the chest services We are aware that this is only one aspect of the whole problem of X-ray film shortage, but it is the one which touches us most nearly

The Ministry of Health has stated that the shortage is mainly due to increased consumption Advancing knowledge in medicine and surgery is intimately bound up with advances in radiology The wider use which has been made of this specialty has necessitated an increased consumption of X ray film, and this increase must be expected to continue

We have an incontestable case for urging the Minister of Health to maintain all possible economies, and also to bring all possible pressure to bear on those concerned with the ordering of the export quota to reduce it to a level consistent with the safety of the whole working of the National Health Service The Minister must be aware that in this matter his interests and ours are the same His hand will be strengthened, and his efforts more likely to be successful, if he can show that the hospital service is doing all it can to economise in the use of X ray film in these difficult times

It is one of the anxieties of this winter that variations in electricity supplies, over which we have no control, may cause many films to be spoilt, and so increase consumption But there are ways in which we can exercise our ingenuity to make the utmost use of our supplies, and it behoves us all—clinicians, radiologists, and radiographers alike—to see that no unnecessary films are asked for, and that no square inch of film is wasted

PETER W EDWARDS
Chairman
R L MIDGLEY
Hon secretary

Joint Tuberculosis Council

CHARCOT JOINTS IN DIABETIC NEUROPATHY

SIR,—We agree with Dr Lawrence and his colleagues (Dec 29) that neuropathic joint changes in diabetes are probably not so uncommon as the number of cases so far reported might suggest It was because of the absence of a full account of the condition in the English literature, and because we feel that cases may go unrecognised unless the possibility of their occurrence is borne in mind, that we reported our case in detail

Regarding the incidence of nocturnal diarrhœa in diabetes, most authorities agree that diabetic neuropathy plays some part in the causation of this symptom, although in our case we have no firm evidence that it was due to autonomic involvement

Dr Hirson (Dec 29) states that we omitted to use liver extract before the onset of the bowel complaint This is not so We stated in our article (Dec 15) that energetic treatment with vitamin B_1 and liver extract had little effect on the neuropathy, and although we did not persevere with liver therapy after the onset of the

TABLE IV—RESULTS OF LIGATION OF LEFT HEPATIC DUCT IN PIG

Date	Total bilirubin (units)	10 min diazotation (%)	Direct bilirubin (units)	Indirect bilirubin (units)
Oct. 14 before operation	1·32	6·0		1·32
16 after operation	3·84	84·5	·18	1·66
„ 18	1·69	0·6		1·60
„ 21	1·69	1·6		1·69
27	0·72	1·9		0·72
Nov 3	0·36	6·5		0·36
„ 10	0·28	0·0		0·28
„ 17	0·28	10·0		0·28
„ 23	0·10			0·10
Dec. 1	0·84	1·2		0·84
9	0·12			0·12
„ 18	0·08	–		0·08

The size of these lobules was much smaller in the atrophied lobes than in the hypertrophied lobes The hypertrophied lobes had become not only larger but also thicker The normally sharp edges of the pig's liver had been transformed in the hypertrophied lobes into well rounded edges (figs 9 and 10)

When radiopaque material was injected through the papilla of Vater only the bile-duct system of the two hypertrophied lobes were filled No communications with the bile-duct system of the atrophied lobes were demonstrable (fig 11)

This experiment shows that in the pig a large part of the liver can be deprived of its biliary drainage without producing jaundice The areas deprived of biliary drainage underwent atrophy, whereas the areas with patent biliary drainage underwent considerable hypertrophy

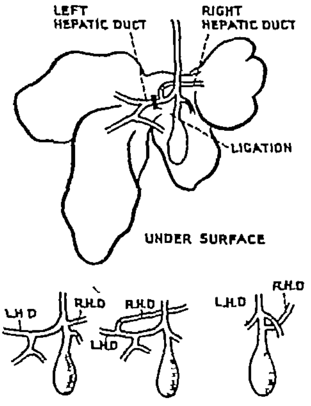

Fig 8—Anatomy of normal pig's liver

DISCUSSION

These experiments show that in the rabbit and the pig a large part of the liver can be prevented from excreting bile without causing jaundice. The resulting condition is compatible with life and the liver tissue with free biliary drainage undergoes hypertrophy, whereas the occluded tissue undergoes simple atrophy with disappearance of the parenchymal cells.

It remains to be seen whether these findings can be applied to man Two questions need answer (1) Does occlusion of one hepatic branch of the ductus hepaticus in man cause jaundice? (2) Does the area with free biliary drainage hypertrophy? If so life would be possible with merely one patent hepatic branch

Brissaud and Sabourin (1884) reported the case of an old woman who died of a complicated fracture of the leg At necropsy it was found that the left branch of the hepatic duct had been completely occluded by a gall-stone Brissaud and Sabourin emphasise the fact that biliary drainage was made absolutely impossible by this obstruction. The left lobe was completely atrophied with dilated bile-ducts containing a colourless fluid The right lobe appeared normal No jaundice was demonstrable

Naunyn (1919), without giving supporting evidence stated that occlusion of separate branches of the hepatic duct does not cause jaundice

Lotzin (1920) described a case with primary carcinoma of the left branch of the hepatic duct without occlusion of the right branch The left lobe of the liver was extremely atrophied with dilatation of the bile-ducts, which contained *colourless fluid. Jaundice was not mentioned*

Rich (1930) recorded a case of complete occlusion of the left branch of the hepatic duct by a gall stone without occurrence of jaundice The part of the liver drained by this branch of the hepatic duct was slightly atrophied bu no appreciable hypertrophy of the remainder of the liver was found.

Fig 9—Upper surface of normal pig's liver showing large left lobes middle lobe and small right lobe.

Marshall (1932) reported a case in which a man with a carcinoma of the left hepatic duct was free from jaundice

Eppinger (1937) stated without giving detailed proof that occlusion of one of the branches of the hepatic duct does not necessarily give rise to jaundice.

From these few scattered observations it might be concluded by analogy with the present experiments that man can tolerate occlusion of one of the branches of the hepatic duct as well as our laboratory animals did On the other hand no conclusion can be drawn from them about hypertrophy of the tissue with free biliary drainage However Lahey (1950) reports a case

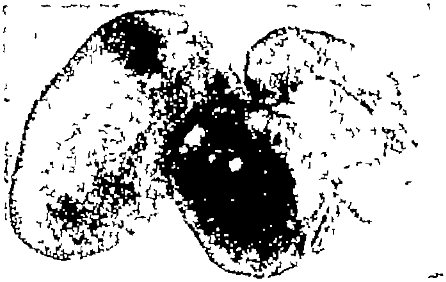

Fig 10—Pig's liver after occlusion of left hepatic branch for 43 days showing enormously hypertrophied right lobe and right part of the middle lobe atrophied left lobes and enlarged liver lobules in hypertrophied parts.

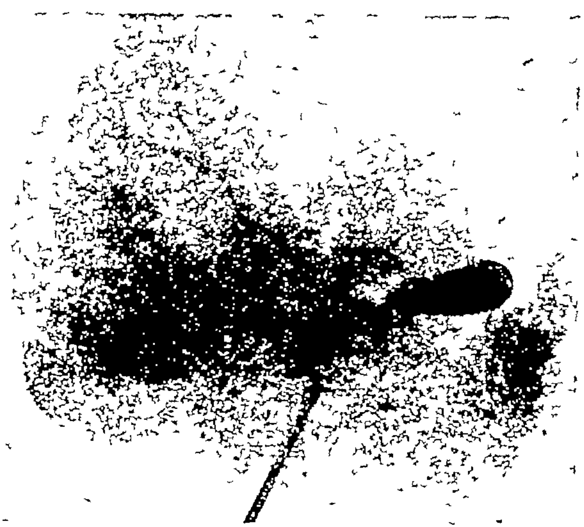

Fig 11—Pig's liver after occlusion of left hepatic branch for 65 days and after injection with contrast medium through papilla of Vater, showing that only the bile-duct system of hypertrophied right lobe and hypertrophied right part of middle lobe can be filled. No development of anastomoses with bile-duct system of atrophied left lobes can be demonstrated

in which complete atrophy of the right lobe was caused by destruction of the right hepatic duct and the left lobe had become as large as a normal right lobe Similar compensatory hypertrophy was seen by Cole (1949) and by Bigger (1950) Moreover Hammer (1928) lescribed cases in which part of the liver tissue had generated into a fibrotic tag, (1) after obstruction of ne left hepatic duct, (2) after accidental ligation of the left hepatic artery, and (3) after thrombosis of the left branch of the portal vein The remaining liver tissue showed considerable hypertrophy A similar case ter ligation of a branch of the hepatic artery is reported y Lahey and Pyrtek (1950)

Recently we found at necropsy of a woman, aged 89, who died of bronchopneumonia, the left liver lobe completely superseded by a calcified cyst The right liver lobe had hypertrophied (fig 12), showing the rounded edges as seen in the hypertrophied liver lobes of the pigs in experiment IV

Further evidence cannot yet be given about what happens in man, but, as it has been shown with certainty that in rabbits and pigs life is compatible with occlusion of the biliary drainage of a very large part of the liver without the development of jaundice, it is justifiable to assume that in man, also, occlusion of one branch of the hepatic duct, depriving about half the liver of its biliary drainage, is compatible with life and good health as long as the other hepatic branch has free biliary drainage The few clinical examples cited above, in which occlusion of one of the hepatic branches was sometimes found at necropsy in cases where there had been no jaundice, give further justification for transposing the findings made in laboratory animals to man

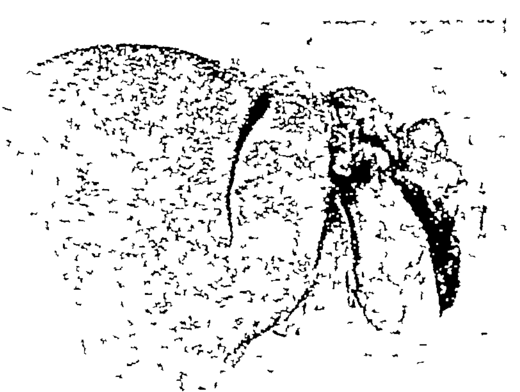

Fig 12—Liver from woman, aged 89 without jaundice, showing left ver lobe completely superseded by calcified cyst, and right liver pertrophied, with rounded edge

If one branch of the hepatic duct can be occluded in man without serious effect on the general health, provided that the other branch of the hepatic duct is unobstructed, the question arises whether this knowledge can be used in clinical practice The answer seems to be that it can, in reconstructive operations for strictures of the bile ducts, closure of bile fistulæ, and stones in one branch of the hepatic duct

Complicated operations (Allen 1945, Cole 1949, Longmire and Sandford 1949) are often necessary to deal with stricture of a bile duct Lahey and Pyrtek (1950), the former of whom is a fervent advocate of direct anastomosis of the two ends of the bile-duct, in many cases made possible by mobilisation of the pancreatic portion of the common duct, report that in 6 of 27 cases thus treated a defect remained, due to insufficient amount of duct available

If it is accepted that one lobe of the liver with free biliary drainage suffices to meet the requirements of the organism, two procedures can possibly be offered to the surgeons to meet their difficulties in the cure of persistent jaundice in these desperate cases

(1) If an insufficient amount of duct is available for restoration of the continuity of the bile duct, one of the branches of the hepatic duct can be tied and cut high in the hilus of the liver, turned down, and used to lengthen the other branch of the hepatic duct, thus making anastomosis of the proximal and distal ends possible, but now draining only one lobe (fig 13)

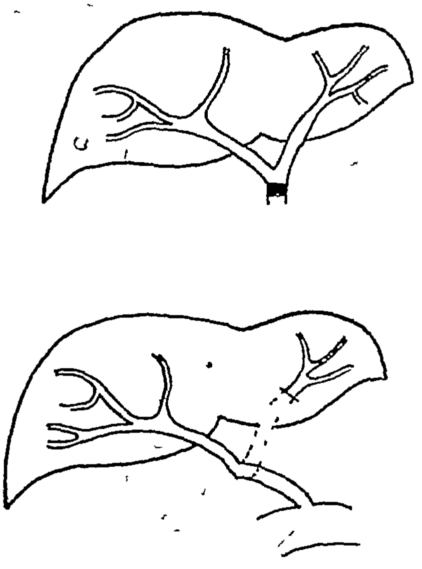

Fig 13—Scheme for using one branch of hepatic duct to lengthen the other branch of hepatic duct in man

(2) If nothing else can be done, anastomosis with only one branch of the hepatic duct may be regarded as a completely satisfactory operation, entirely meeting the requirements of liver function of the organism

The proposed procedure will probably be of value in only very few cases But if the surgeons can accept the perhaps rather revolutionary concept of deliberately depriving a complete liver lobe of its biliary drainage, they can weigh up the value of this anatomically simple but probably difficult operation against those of the complex operations now often necessary It is improbable that all the complex operations can be avoided, but only surgical work can prove whether the procedures now proposed are of any help in suitable cases and are technically possible (Schalm 1951)

SUMMARY

Experiments with rabbits and pigs have shown that deprivation of large parts of the liver of biliary drainage did not give rise to jaundice and was compatible with life and good health.

The occluded areas did not drain their bile, if produced, by means of intrahepatic biliary anastomoses

Probably the secretion of all the bilirubin was accomplished by hyperfunction of the liver tissue left with free biliary drainage.

The occluded areas underwent gradual atrophy with compensatory hypertrophy of the areas with free biliary drainage.

Probably these findings can be applied to man If so they can be put to practical use in surgery

(1) One branch of the hepatic duct may be cut at the hilus of the liver and used for plastic operations with the common bile-duct

(2) Anastomosis with one of the hepatic ducts is a completely satisfactory operation.

(3) One branch of the hepatic duct may safely be sacrificed if the operation entails it.

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ACCIDENTAL SPINAL INJECTION OF XYLOCAINE

DURING ATTEMPTED EPIDURAL ANALGESIA

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IN performing paravertebral epidural or caudal analgesia one must bear in mind the risks associated with injecting relatively large quantities of local anæsthetic drugs, often in strong solution into the subarachnoid space To the experienced anæsthetist the management of a temporarily paralysed patient is familiar; provided that three essentials—free airway good oxygenation and elimination of carbon dioxide, and adequate circulation—are present, recovery should be uneventful in a healthy person Odom (1936) mentioned a case in which 20 ml of 2% procaine was injected inadvertently into the subarachnoid space: 7 minutes later respiration failed and there was a considerable fall in blood pressure but recovery was complete within 30 minutes Dawkins (1945) Durrans (1946) and Fujikawa et al (1948) warn against spinal injection and imply that low spinal analgesia occasionally follows a test dose of solution

The following case is reported because epidural analgesia may become more popular in this country now that 'Xylocaine is more easily obtainable When the accident happened I was not familiar with the technique, having given only about six such injections previously

CASE RECORD

A fit woman, aged 31, was to undergo a tracholorrhaphy followed by a Gilliam's ventrisuspension of the uterus, for leucorrhœa and retroversion. Her respiratory and cardiovascular systems were normal; the blood pressure (B.P.) was 144/80 mm. Hg and the hæmoglobin 12 7 g per 100 ml (88% Haldane)

Premedication was by means of subcutaneous 'Omnopon' gr $^1/_3$ (20 mg) and scopolamine gr $^1/_{150}$ (0·4 mg), which made the patient very sleepy by the time she reached the theatre $1^1/_2$ hours later

Spinal Injection.—At 2.40 P.M a Howard Jones spinal needle was introduced between the spines of the 12th thoracic and 1st lumbar vertebræ and difficulty encountered in finding the epidural space led to the fear that the dura might have been pierced although no cerebrospinal fluid (C.S.F.) appeared at the hub of the needle No indicator was used A syringe containing 20 ml of 2% xylocaine (with adrenaline 1 : 50 000) was then attached and the piston withdrawn; no blood or C.S.F. returned into the barrel and the whole 20 ml. was accordingly injected. The patient who had been lying on her left side, was turned on to her back; thiopentone 0·5 g in 5% solution was injected intravenously, and oxygen was administered with the semi-open circuit of a Boyle's machine Within 3 minutes it was noticed that she was apnœic and that her pupils were widely dilated and did not react to light, though her pulse was slow and regular and her colour good It was impossible at this stage to be sure whether the apnœa was due to the thiopentone or to an accidental spinal injection of the xylocaine but the latter was immediately suspected

The *operation* was proceeded with relaxation being excellent and bleeding minimal while artificial respiration with oxygen was continued. At 3 P.M (20 minutes after the xylocaine injection) apnœa was still present, the colour was good, the pulse regular (rate 84) and the systolic blood pressure 90 mm. Hg At 3 5 P.M an intravenous injection of nikethamide 5 ml. had no effect on apnœa pulse or blood pressure At 3 15 P.M the operation was finished the pulse-rate being 84 and systolic blood pressure 95 mm Hg

Restoration of breathing—The patient who had been placed first in the lithotomy position, and then supine with a 5% head down tilt, was now transferred to a trolley and returned to the anæsthetic room where a 10% head-down tilt was maintained and artificial respiration with oxygen was continued in the closed circuit (Coxeter Mushin), after oral intubation with a Magill tube to which there was no reaction. The pulse rate remained steady at about 80 and the B.P rose slowly from 90/65 to 110/70 ($^1/_4$ hourly readings) In view of this, and because the colour was good no stimulant or vasoconstrictor drugs were given At 4 5 P.M (85 minutes after induction) a definite tracheal tug was noticed but no movement of gases to and from the lungs could be detected at 4 10 P.M the pupils though still widely dilated reacted to light at 4 15 P.M adequate diaphragmatic respirations were present and artificial respiration was stopped, though oxygen was continued At 4.30 P.M (after 110 minutes) the B.P was 100/75 pulse rate 78 respirations adequate and regular the colour good and an early recovery seemed likely

Within the next $^1/_4$ hour the patient became noticeably paler and the pupils again did not react to light and were still widely dilated although the colour of the lips and ears remained good; at 4 45 P.M the B.P was 80/55 the pulse-rate was only 38 and the respirations were becoming shallower; within the next 5 minutes something over 30 mg of Methedrine (N methyl amphetamine) was administered in two doses intravenously—some was lost from the first dose—but had no effect respirations pulse and apex beat all being undetectable Had it not been for the pink colour of her lips the patient would have been thought dead At 4.55 P.M however a faint pulse could be felt the rate being only 32 at 5 P.M (after 140 minutes) nikethamide 5 ml. was injected intravenously within a minute the patient opened her eyes, looked about and began to breathe again; the endotracheal tube was removed and oxygen was continued with a B L.B oronasal mask At 5 15 P.M the B.P was 200/100 pulse-rate still 32 and at 5.30 P.M the readings were 190/105 and 44 The patient was returned to the ward the oxygen being discontinued; she complained of weakness and tingling in the arms and numbness and paralysis of the res body, but this passed off in $^1/_2$–1 hour On return to the ward, the B.P was 120/75 and the pulse rate 50, $^1/_2$ hourly B P and pulse readings were taken until 4 30 A M. next day, by which time the B.P had steadily risen to 140/80 mm Hg, and the pulse rate to 110

Progress—Next day the only complaint was of slight dizziness and diplopia and a slight breathlessness, on the following day the patient felt well, apart from pain and discomfort due to the operation A low pyrexia (98 4–99 5°F) persisted until she was discharged from hospital, it was due to a *Bact coli* infection of the urinary tract, but there were no other ill effects

COMMENTS

Although no C.S F escaped when the injection was made, presumably the dura was pierced, and some, if not all, of the xylocaine must have entered the subarachnoid space, causing a block involving the medulla and spinal cord at least, the full extent being obscured by the effect of the thiopentone It is interesting that, after the respiratory centre had recovered and the first danger seemed to have passed, there should have been a sudden collapse of the circulation, in view of the ensuing extreme bradycardia, it is tempting to assume that the medulla (including the vagal centres) recovered while the sympathetic fibres in the cord were still paralysed, and the consequent overaction of the vagus lead to cardiac arrest, with an "escape" of the ventricles to their intrinsic rhythm of 32 contractions a minute Electrocardiography was not done The transient hypertension which followed recovery was presumably due to the action of the methedrine and nikethamide

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TREATMENT OF CARDIAC ARREST

FILLING THE HEART BY EXPELLING BLOOD FROM THE LIMBS

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THE object of this note is to suggest a simple means of treating cardiac arrest

On Aug 23, 1950, in this hospital, a boy, aged 4 years, stopped breathing at the end of inhalation anæsthesia for treatment of two compound fractures in his left hand It was then found that he had no pulse His upper abdomen was opened, the diaphragm was divided, and the heart was palpated directly, and found to be small and empty

The following treatment was adopted While a nurse held the boy's legs vertically, another nurse applied Esmarch's bandages from toes to trunk The heart was immediately felt, between my fingers, to enlarge to twice its previous volume, or more As soon as it filled, it began to beat The beating continued for three minutes and then became irregular and stopped The arm on the unaffected side was then held vertically, while an Esmarch's bandage was rapidly applied from fingers to shoulder Again the heart was felt to enlarge to about twice its previous volume and started to beat again, but this time only for two minutes. Further attempts at resuscitation were unsuccessful.

Perhaps this measure has often been tried, but I have not heard of its previous use in cardiac arrest Since the heart twice began to beat again when it was filled, this method of filling it is probably worth further trial

Preliminary Communication

THE MOVEMENT OF THE MENISCUS OF THE TEMPOROMANDIBULAR JOINT

THE accepted teaching on the movement of the temporomandibular joint is based on two premises

(*a*) That the head of the condyle rotates beneath the meniscus as the jaw opens and closes
(*b*) That the meniscus, surmounted on the condyle head, moves forward on to the articular eminence as the jaw opens, returning to its resting position as the jaw closes

It is therefore taught that the normal opening movement of the jaw involves a rotation of the condyle head beneath the meniscus while the meniscus moves forward in the closing movement the procedure is reversed.

The forward movement of the meniscus, as described in current textbooks, is an essential part of this concept of the function of the temporomandibular joint However, while preparing anatomical specimens to show the disposition of the muscles round the joint it was noticed that the posterior edge of the meniscus was tightly bound down to the deepest part of the glenoid fossa, suggesting that forward movement of the meniscus in this particular joint was unlikely So fresh joint specimens were investigated to confirm this observation

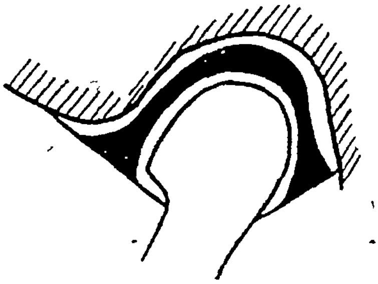
Fig 1—Conventional representation of sectioned temporomandibular joint.

Very little has been published on this subject Stones[1] and Vaughan[2] suggest that forward movement of the meniscus might not be so great as that of the condyle, but all other workers agree with the description given above (Fig 1 shows the conventional diagram of the temporomandibular joint)

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[1] Stones, H H Oral and Dental Diseases Edinburgh 1948 p 658
[2] Vaughan, H C *J Amer dent Ass* 1943, 30, 1501

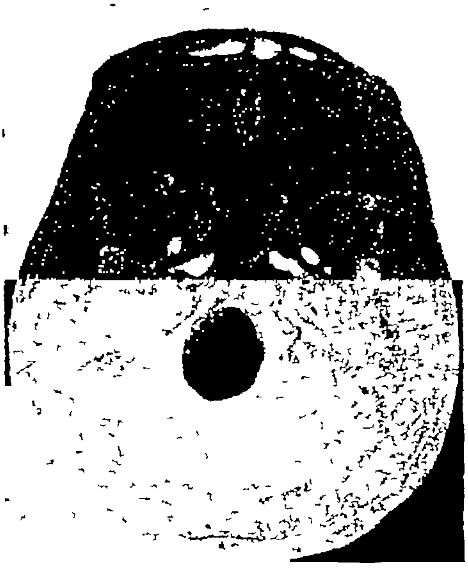
Fig 2—Square windows cut in floor of middle cranial fossæ to expose upper surfaces of both menisci

INVESTIGATION

Material was obtained from fresh specimens. The methods of investigation were:

(1) Injection of meniscus with radiopaque material (mercury) and subsequent radiography with the condyle in different positions This method gave inconclusive results

(2) Observation of the meniscus through a small window cut in the floor of the middle cranial fossa. This was first carried out on specimens of joints removed from the body subsequently the observations were repeated using windows cut to expose the menisci of both left and right sides while the joints remained *in situ* in the body (fig 2) It was seen that in normal opening and closing of the jaws the meniscus did not move in any direction Sideways movement of the condyle (the Bennett movement) was accompanied by a small movement of the meniscus *with* the condyle

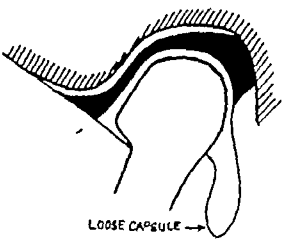

Fig 1—Diagram of section of temporo-mandibular joint based on results of investigation.

(3) Dissection of joints with an endeavour to relate structure to function.

(4) The construction of geometrical diagrams and working models, with data obtained from (3)

The following observations were made

(1) The fossa and eminence are not shaped so as readily to permit anterior-posterior movement of the meniscus.

(2) The attachment of the meniscus to the base of the skull is tight posteriorly (fig 3)

(3) The lateral and medial edges of the meniscus are also tightly attached to the base of the skull. If the meniscus were to move forward, these attachments would be loose

(4) The attachment of the posterior edge of the meniscus to the condyle neck is very loose (fig 3)

(5) The ligamentous lateral link between condyle and meniscus, a thickening of the capsular ligament, is so arranged that the condyle can move throughout its normal range both in rotation and forward slide on the undersurface of the meniscus. In fact if the condyle rotates at all, forward movement of the condyle in relation to the undersurface of the meniscus must also take place

The stages leading to this last observation are too complex and lengthy to be included in a preliminary report

CONCLUSIONS

The limited amount of material examined does not yet permit publication of a new conception of temporo-mandibular joint behaviour However, it is felt that the results obtained from this investigation suggest that the meniscus does not move as the jaw opens and closes, but may move slightly in lateral chewing movements. Thus, in the upper compartment of the joint side-to side sliding of the meniscus can take place and in the lower compartment the condyle rotates and slides forward on the underside of the meniscus, while the meniscus itself remains stationary

The insertion of a small portion of the upper head of the lateral pterygoid muscle into the anterior edge of the meniscus and adjoining capsule would seem to provide a means of stabilising the meniscus. Owing to the shape of the articular eminence there is a tendency for the meniscus to be forced *laterally* as the condyle moves forward The lateral pterygoid muscle may well prevent this lateral movement in *anterior* excursions of the condyle Inspection of the anatomy of the part shows no apparent means whereby if the meniscus was pulled *forwards* by the lateral pterygoid muscle, it could be returned to the original position

It is realised that it is possible that movements of the meniscus other than those described above may well take place, particularly in pathological joints. The joints examined for the purpose of this investigation were as far as could be ascertained, within normal limits. No movements other than those described above were seen in these

When sufficient material has been accumulated it is hoped to publish a full account of the investigation

My thanks are due to Mr A. O Chick, M.D.S. Senior Lecturer in Charge, Prosthetic Department for generous advice and encouragement in this investigation.

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Reviews of Books

Medical Bacteriology

(5th ed.) Sir LIONEL WHITBY, M.D., F.R.C.P., regius professor of physic, University of Cambridge MARTIN HYNES M.D., M.R.C.P pathologist, Royal Northern Hospital London London J & A Churchill. 1951 Pp 544. 22*s* 6*d*

IN all but name this is a new book; but it is still written from the standpoint of a clinical pathologist. Students will be glad that only 37 pages are needed for the bacteriology of all the pathogenic cocci together with the epidemiology, pathogenesis, and treatment of the diseases they cause Even so, the book keeps its size for the latest advances in knowledge burgeon in the weeded spaces. The common pathogens hypersensitivity, immunity, and new methods of treatment are all clearly described The section on viruses is very good and there are short accounts of the fungi protozoa, and helminths. Many students qualify without knowing how to collect specimens for laboratory examination, and the chapter on this subject is valuable, although many would hesitate to follow the procedure described for taking a blood-culture. A description of common contaminants on culture media is another useful addition to this popular textbook.

Biochemistry and Physiology of Protozoa

Vol. I Editor ANDRÉ LWOFF head of the department of microbial physiology Pasteur Institute Paris New York: Academic Press. 1951 Pp 434 $8 80

INTEREST in the biochemistry of the protozoa has been growing steadily of late years, but publications on the subject are scattered through many journals. In this volume the first of two much of this material has been collected in seven articles all in English, and written by two French and six American workers. The subjects dealt with in this volume are the nutrition metabolism and growth of the phytoflagellates, the parasitic flagellates and amœbæ, the trypanosomidæ and the bodonidæ, the biochemistry of ciliates and also the biochemistry of plasmodium and the influence of antimalarials. A tremendous amount of work has been summarised as is shown by the extensive references at the end of each article. The book, which is elegantly produced is certain of a warm welcome from students and research workers

Speech Habilitation in Cerebral Palsy

MARION T CASS M.A. cerebral palsy therapist in the Metropolitan area of New York City New York Columbia University Press. London: Oxford University Press 1951 Pp 188 20*s*

IN those neurological disabilities grouped together as the infantile cerebral palsies, the clinical pictures seen by the orthopædic surgeon are not present in the infant. In some cases of gross structural defect in which potentiality for development of functional attainments is absent abnormal signs are exhibited from the time of birth In others failure to provide appropriate early treatment results in the development of abnormality of function sometimes in gross degree This book draws attention to the need for early diagnosis and treatment but it is chiefly concerned with a number of comp techniques which Miss Cass has devised in collab with an orthopædic surgeon, intended to ameliorate established malfunction, in particular abnormality of speech The method seems to be extremely complicated

Miss Cass tells the child " to pretend that he is going to sleep ", and he must do this for half an hour before treatment proper is begun. The treatment consists in demonstrations and exercises, for example, the therapist makes an imaginary birthday cake, and places a number of candles on it "Have the child blow out each candle with a short puff. Make a contest of it to see if he can do it without blowing out more than one at a time " Another good exercise is said to be to start with a relaxed opening of the lips Place in the opening a large (in diameter) long lollipop by using objects of smaller diameter the size of lip opening can be reduced to that of a no 2 knitting needle " A gustatory centre of focus " may be provided by " immersing glass rods of this size in a sweetened liquid " Sounds are then taught These exercises, Miss Cass says, are merely the foundation for work to follow, such as the recitation of verses

Every speech therapist has her own techniques for getting the child to use his lips and larynx correctly, and these are quite useful ones If the child with cerebral palsy is treated early enough, however, his speech organs share in the general gain in muscular control and such elaborate training in the use of them is not usually necessary

A Students' Radiological Mathematics

L A W Kemp, B SC, F INST.P, physicist to the London Hospital Oxford Blackwell Scientific Publications 1951 Pp 315 21s

The candidate for a radiological diploma very often finds his physics an unappetising preliminary to the main fare of clinical radiology Mr Kemp's book will aid his digestion and enable him to appreciate some of the elegant mathematical devices which, in truth, simplify his specialty The author deliberately goes beyond examination essentials, in the hope of providing a surer foundation for a complete study of radiology He emphasises the practical application of his teaching at every stage and does not hesitate to go into the physics of the matter as well However unhappy the reader may feel about his sums, he need not be deterred, Mr Kemp will start him off with the simplest notions of *x* and *y*, and lead gently on to trigonometry, logarithms, and the mysterious "*e*" Finally he will be cautiously introduced to infinitesimal calculus, that most beautiful method of reckoning None need quake at the name, a great mathematician and physicist, Silvanus P Thompson, assured his students of the calculus that what one fool can do another can This book dispels some mathematical terrors and shows them to be the friends they really are

Die Trübungsformen der menschlichen Linse

Hans Sautter, apl professor und Oberarzt an der Universitäts Augenklinik, Tübingen Stuttgart Thieme 1951 Pp 138 D.M. 49 80

This brief account of the different forms of cataract deals largely with the slit-lamp appearances It is profusely and beautifully illustrated from a collection originally begun by Bücklers at Tübingen in 1930 No claim for originality is made, and the text and illustrations are in fact largely based on the monumental volume by Vogt A fairly extensive bibliography aims—not quite successfully—at supplementing the full bibliographical lists in the older standard texts on cataract

Das Röntgenbild des entwicklungsgestörten Uterus

Zwanglose Anhandlungen auf dem Gebiete der Frauen heilkunde, Band 11 Dr Hans Finkbeiner, Berlin Leipzig Thieme 1951 Pp 66 D.M 7

This is a comprehensive monograph based on 800 hysterosalpingographies performed at the University Women's Clinic at Heidelberg Dr Finkbeiner believes that hysterosalpingography should be a routine investigation in cases of sterility, a view shared by leading French authorities such as Claude Béclère and the Palmers He says that some maldevelopment of the uterus was found in 38 % of his cases of female infertility He holds that uterine development may be functionally marked, and presents arteriograms showing that in this type of uterus the anastomosis between the two sides is deficient—indicating that fusion of the müllerian ducts has been incomplete His monograph is well produced, well illustrated, and clearly written, and it should be of interest both to radiologists and to those concerned with human infertility

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The Royal Hospital of Saint Bartholomew (London St Bartholomew's Hospital 1951 Pp 27 1s 6d)—In this illustrated historical sketch Mrs Gweneth Whitteridge, the hospital archivist, describes how St Bartholomew's was founded in 1123 and is the only one of London's medieval hospitals still to occupy its original site The first reference in the hospital records to medical students was made in 1662, and five years later it was decided that there should be a library " for the use of the Governors and young University scholars " St Bartholomew's is also a separate ecclesiastical parish, and the parish chest, made in 1671, " was rediscovered in 1949 "

Food and Nutrition (2nd ed Edinburgh E & S Livingstone 1951 Pp 443 30s)—Prof E W H. Cruickshank's refreshing book has moved on from the dietary victories of the war years to those, no less renowned, of peace *He apologises, in his preface, for the inevitable gaps which* must appear in a brief book dealing with a rapidly growing subject, but most of the doctors and medical students to whom the work is addressed will feel he has given them hand some measure, while those whose appetite he merely sharpens will find ample provender among the references

Management of Fractures, Dislocations and Sprains (5th ed. London Henry Kimpton 1951 Pp 1232 115s)—The fifth edition of this admired and solid work by Prof John Albert Key and Prof H. Earle Conwell has been so extensively *revised that the whole text had to be reset The authors did* their best to make it lighter and less bulky, but the growth of their subject defeated them, and as fast as they took out illustrations and pared the text with their left hands, their right hands filled up the space with new methods or modifi cations of old methods, and with new and better pictures. (All the same, some of the woollier radiographs have survived.) They have, in particular, extended their account of the treatment of compound fractures, and they now include the use of medullary fixation of fractures of the femur and the tibia

Cunningham's Textbook of Anatomy (9th ed London Oxford University Press *1951 Pp 1024 90s*)—For many of us, Cunningham's *Anatomy* was the first medical textbook we bought, and the successive reappearances of this old friend are welcome events It is eight years since the last edition, and in the interval another extensive revision has been accomplished, both of the text and of the illustrations. There have been some changes in the authorship of the sections, owing to the death of previous contributors, and Dr E B Jamieson, who had been co-editor since 1937, has now retired, so that the task of editorship falls on Prof James Couper Brash alone An innovation in this edition is the provision of a list of references at the end of each section to act as sources of further information for senior students and others Many new figures have been added, and many old ones refurbished by the addition of colour the radiographs, which are a feature of the book, maintain their high standard It is perhaps rather odd that the individual carpal bones are still not figured separately, though the metacarpals, the metatarsals, and such tarsal bones as the cuneiforms are accorded this attention As a result of some of these changes the size of the book has increased by 45 pages, though the length of the actual text remains approximately the same

One criticism may be made why is it necessary to adhere so slavishly to the rigid translation of inches into millimetres ? On occasion this leads to absurdities, such as the statement that the left kidney is about 1 3 cm higher than the right To the Anglo Saxon mind the phrase " about half an inch " conveys the wholly admirable idea that considerable variation is possible, whereas its exact Gallic counterpart conveys the wholly spurious idea of minute precision. It would be more accurate, not less, to say that one kidney is 1–2 cm higher than the other

The form, the text, the illustrations, and the production all compel admiration, and this new edition will enhance this book's reputation

THE LANCET

LONDON SATURDAY, JANUARY 12 1952

Maternal Mortality and Morbidity

THOUGH the death of a mother in childbirth will always command attention, the maternal mortality rate, which reflects such deaths in the aggregate, usually receives scant regard. Nevertheless, twenty years ago it was the continuance of a high death rate that first disturbed the national conscience about the risks to women in labour. Widespread investigations led to the publication in 1937 of a Ministry of Health report[1], and thenceforth mortality decreased. The wearing of efficient face-masks and the strict bacteriological control of cases of puerperal sepsis were the first important advances; and these were soon followed by others—particularly the introduction of the sulphonamides and penicillin, and the establishment of a National Blood Transfusion Service. Whereas in 1934 maternal deaths in England and Wales numbered 2880, in 1945 the corresponding figure was 1262, and in 1950 it was 620. Yet much remains to be done, as WEBB and WESTON EDWARDS,[2] of the Institute of Social Medicine at Oxford, have lately shown.

These workers draw attention to the change in the relative importance of the main factors in maternal mortality. Whereas in 1940–42 the order was sepsis, hæmorrhage, toxæmia, and accident, in 1946–48 sepsis was last in importance and toxæmia had moved from third to first place. They suggest that until we know the cause of toxæmia of pregnancy fatalities attributable to this group of diseases may best be reduced by improved antenatal care. What can be done in this way is shown by Dr HAMLIN's impressive article on an earlier page, and by DIXON HUGHES's[3] equally striking report from the same hospital. Certainly many women still receive quite inadequate antenatal care. Some do not grasp the need for proper medical supervision; others are deterred by the time that may be spent in waiting for attention at a busy clinic. Furthermore, much antenatal care is ill considered or even out of date. Commonly routine practices are slavishly followed with little or no thought. The examinations and even the whole antenatal care, may become the end rather than the means to the end. One example is the weighing of patients (a routine in many clinics): for how often is a serious attempt made to check excessive gain in weight? Even abdominal palpation can become a misused routine. In a normal case it is quite unnecessary to examine the patient's abdomen at every antenatal visit; this wastes the time of patients and staff and may divert attention from other more important matters. Much antenatal care is in the hands of doctors employed by local health authorities and good work is done by them. At the same time, however, the practice of obstetrics is rapidly changing; and unless these medical men and women have regular contact with those responsible for the intrapartum care of patients they inevitably lose touch and thus cannot play a full part in the maternity services.

WEBB and WESTON EDWARDS also compare the maternal mortality rates in the main geographical regions of England and Wales; and they show that whereas the death rate from sepsis is independent of region, that from other causes is significantly higher in rural than in urban areas. The explanation may be that some maternity services are less easily provided than others. The treatment of sepsis is equally easy in rural and urban areas; but that of severe hæmorrhage—depending on means of transport, suitable apparatus, and skilled blood transfusion—cannot so easily be provided in the country. It seems, therefore, that the regional organisation of the obstetric flying squads should be reviewed to ensure that the rural areas are well and quickly served. Moreover, every general practitioner should know to which centre he can turn for help in a case of retained placenta, postpartum hæmorrhage, or other serious obstetric difficulty where immediate removal to hospital would be unsafe.

With the maternal mortality rate down to less than 1 per 1000, the attack should now be directed against morbidity; and it may be assumed that as morbidity is checked the number of deaths will fall still further. Detailed studies of morbidity involve the long follow-up of many patients—a costly and difficult business. Already, however, obstetricians are examining their results with an eye to making childbearing less hazardous to health, in the same way that fifteen years ago they set about making it less dangerous to life.

Experimental Cancer of the Thyroid

IN 1931 SIR THOMAS DUNHILL[1] commented on the difficulty of drawing any hard and fast line between the histological appearances of compensatory hyperplasia and those of simple tumours of the thyroid, and between the appearances of simple and of malignant tumours. The three categories appeared to him to be arbitrary points in a smooth transition, with compensatory hyperplasia at one end of the scale and certain malignant tumours at the other. These tumours (papilliferous adenocarcinoma and malignant adenoma) could be regarded as variants of the physiological hyperplasia which occurs whenever there is a deficiency of circulating thyroxine. Later work in the laboratory has gone far towards confirming Dunhill's thesis. In 1945 GRIESBACH et al.[2] showed that in rats a diet containing rape seed led first to a uniform hyperplasia of the thyroid, and later to the occurrence of discrete and often multiple adenomata. Rape seed contains an antithyroid substance belonging to the thiourea series, and the New Zealand workers were able to show that both the initial diffuse hyperplasia and the later adenomata were the results of increased production of thyrotropic hormone induced by a relative deficiency of thyroxine in the circulating blood. PURVES and GRIESBACH[3] gave thiourea to another series of rats and adenomata developed in glands which initially showed only diffuse hyperplasia, but on this occasion at least two of the adenomata were undoubtedly malignant, for there were metastases in the lungs Later Purves and Griesbach, together with Bielschowsky and Hall,[4] found that such tumours could be grafted into other rats, provided that the recipients had been rendered thyroxine-deficient either by thyroidectomy or by the administration of an antithyroid substance Histologically the grafted tumours commonly resembled malignant adenomata in man Often they were locally invasive and grew to a very large size In later generations one of these grafted tumours lost all resemblance to normal thyroid tissue and became highly malignant [5] Workers in this country [6] and in America [7] have had no difficulty in confirming that simple adenomata develop in rats which are given thiouracil for a long time, but there have been no further reports of malignant tumours following administration of antithyroid drugs alone, possibly the New Zealand strain of rat is particularly liable to cancerous change

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[1] Report on an Investigation into Maternal Mortality. Cmd 5422 H.M. Stationery Office 1937

[2] Webb, J., Weston Edwards, P. *Med Offr* 1951, 86, 201

[3] Hughes, T. D. *Med J Aust* 1951, ii, 871.

[1] Dunhill, T. P. *Brit J Surg* 1931, 19, 83

[2] Griesbach, W. E., Kennedy, T. H., Purves, H

Path 1945, 26, 18

[3] Purves, H. D., Griesbach, W. E. *Ibid* 1947

These experimental tumours so far have been attributed simply to thyrotropic stimulation Two substances are known to augment and accelerate the effect of such stimulation One of these is a well known carcinogen—acetylamino-fluorene (A.A F) Bielschowsky [8] showed that A.A.F alone did not affect the thyroid, but, when it was given before or together with an antithyroid drug adenomata appeared much sooner and in greater numbers than they would have done with such a drug alone Bielschowsky [9] also made the important observation in rats that, although A.A F will not induce tumours in the intact thyroid, it will do so in the remnant left after subtotal thyroidectomy, even without administration of an ntithyroid drug By reducing thyroxine production btotal thyroidectomy stimulates the production of thyrotropic hormone, which leads to tumour formation Secondly, this process is accelerated by radio-iodine Doniach [6] gave a single dose to four groups of rats, the first group received no further treatment, the second was given methyl-thiouracil, the third A A F, and the fourth both drugs together The preliminary dose of radio iodine increased the number of tumours in all groups, compared with the corresponding controls, but the figures were barely significant in that treated with A.A.F alone Doniach's results show clearly that radio-iodine, as well as A.A F, can reinforce the thyrotropic stimulus and so increase the formation of tumours Both drugs seem to make certain thyroid cells respond to the thyrotropic hormone by local growth instead of taking part in an orderly hyperplasia of the whole gland.

In man the behaviour of goitres suggests that the response to thyrotropic stimulation resembles that in the rat With iodine deficiency the thyroid at first enlarges symmetrically, but later discrete nodules appear, and some of these nodules may finally become cancerous The sequence of diffuse hyperplasia, benign adenoma, and cancer is the same as that observed experimentally But if the path to cancer is the same in man and the rat, why is cancer so rarely seen in association with human thyrotoxicosis ? Here the thyroid is certainly stimulated in a manner analogous to the stimulation of the rat's thyroid by thyrotropic hormone, sometimes for years Moreover, modern treatment intensifies the stimulation Subtotal thyroidectomy, by suddenly reducing the level of circulating thyroxine, must surely increase the stimulus to the remaining thyroid tissue Patients whose goitres recur after this operation should theoretically be more liable to develop tumours than others, but, although recurrent toxic goitres are often somewhat nodular (even when the original goitre was diffuse), cancer is exceedingly rare Like subtotal thyroidectomy, the administration of an antithyroid drug tends to increase the output of thyrotropic hormone in a thyrotoxic patient, often this is evident from an increase in the size of the goitre On the basis of the experimental work such a situation also might be expected to lead to malignant changes, and here we have no lengthy clinical experience to assure us that the theoretical danger can safely be neglected—antithyroid drugs have been in use for only eight years There are, however, two reassuring points Firstly, malignant change in toxic goitres, even when further stimulated by subtotal thyroidectomy, is rare, secondly, antithyroid drugs are usually given only for a year or two It takes about this time to cause tumours in the rat's thyroid, and since the rat lives at a faster tempo than man this period might be expected to correspond to a longer time in human life Laboratory evidence should not, therefore, deter the clinician from administering antithyroid drugs in courses lasting a year or so Longer courses may, however, involve real danger of malignant disease Herrmann [10] found cancer in the thyroids of two thyrotoxic patients who had had methyl-thiouracil for 3–4 years Both glands contained multiple adenomata of very varied structure, and in one case penetration of the capsule or invasion of blood vessels was seen in three distinct tumours It must be remembered, however, that even these criteria of malignancy are not infallible in the thyroid, the pathology of which is notoriously difficult Possibly, too, the tumours were not caused by thiouracil, the patients came from a region where goitre is common—which may have been a contributory factor But the development of multiple adenomata of varied structure in a diffusely hyperplastic gland is, to say the least, reminiscent of the results of long-continued stimulation of the rat's thyroid Even the suggestion that so widely used a remedy may induce cancer is bound to be disturbing, but nothing in these reports need discourage the use of antithyroid drugs in reasonable doses and for limited periods Certainly they should never be given in doses large enough to cause hypothyroidism, for the symptoms of this are unpleasant, and inevitably the production of thyrotropic hormone will be further stimulated With regard to radio iodine, Doniach has shown that this increases the liability to tumour formation in thyroid cells subjected to a thyrotropic stimulus, and furthermore, by reducing the effective thyroid mass and so decreasing thyroxine production, it stimulates production of thyrotropic hormone. Thyrotoxic patients treated with radio iodine may therefore be exposed to a greater risk of carcinogenesis than they would be with either subtotal thyroidectomy or the antithyroid drugs, which have no specific carcinogenic action. Those using radio iodine are well aware of this theoretical danger and therefore tend to restrict its use to carefully selected, and usually elderly patients. In such cases the complete absence of immediate complications justifies the remote and so far hypothetical risk.

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[4] Bielschowsky F, Griesbach, W E Hall, W H, Kennedy, T H., Purves H D *Brit J Cancer* 1949 3, 541

[5] Purves, H. D, Griesbach W E., Kennedy, T H *Ibid*, 1951 5, 301

[6] Doniach I *Ibid*, 1950, 4 223

[7] Money W L, Rawson R. W *Trans Amer Ass Goiter*, 1947, p 171

[8] Bielschowsky, F *Brit J exp Path* 1944, 25, 1

[9] Bielschowsky F *Brit J Cancer*, 1949, 3, 547

[10] Herrmann, E *Schweiz med Wschr* 1951, 81, 1097

One further practical point emerges from DONIACH's work. He showed that in the rat one dose of radio-iodine, followed by a course of methyl thiouracil, is a particularly effective method of producing thyroid tumours. Yet the clinician may be tempted to employ this very sequence. When a severely thyrotoxic patient, judged unfit for operation is treated with radio iodine the response is apt to be slow and uncertain (though it is always effective in the end), and doses may have to be repeated for perhaps a year. Meanwhile the patient remains very ill, and the physician may thus advise thiouracil while waiting for the radio iodine to act. With the laboratory evidence before us, this seems an altogether unjustified risk.

Tasks for the M.O.H.

THE cost of revolution must be counted long after the event, and we still stand too close to July 5, 1948 to be able to measure accurately either gains or losses. Much has been heard of the changes it has wrought in general practice, but not enough, perhaps, about its effect on the local government public-health service. This product of a century's growth stood four square and apparently durable for all time, but today even the need for its existence is being called in question by some. Admittedly, preoccupation with the provision of hospital services sometimes lessened the attention given by local health authorities to their primary function of preventing disease and promoting health, but the removal of these hospital and clinical interests was undoubtedly a severely traumatic change: a patient may bleed to death after removal of a tumour as well as after removal of a vital limb. In certain directions the powers of the authorities have been increased by the Act, and there is still no country where organised public health has wider powers or more universal machinery. But within the structure there are signs of deterioration: loss of interest on the part of local representatives is shown by a fall in the quality of membership of health committees, loss of a sense of purpose and direction on the part of local officials, and especially the medical officer of health, is shown in a common sense of frustration and in a falling away of recruitment to the service. What now seems necessary, if the situation is to be saved, is a careful study to determine the jobs which the public health services can do better than anyone else, and a determination that they shall have the necessary power and backing to perform these tasks.

The National Health Service in Scotland is a trimmer ship than the much larger service in England and Wales, so it was not surprising that the Scots should turn their attention earlier to the difficult position of the local health authorities and their medical officers of health. Having had indications in the recent report of the Department of Health for Scotland,[1] we now have the results of a committee inquiry published under the title, What Local Authorities can do to promote Health and Prevent Disease.[2] Perhaps hopes aroused by such a title were bound to be disappointed in some measure, and there are parts of this report which read as though its authors had sat round a table to compile a list of all possible ways in which disease prevention and health promotion might conceivably be furthered. Certainly it is well to remind ourselves from time to time just how much work there is still to be done, but many of the outstanding tasks call for more staff and more machinery, and for new skills as well, and a covering note from the Department of Health for Scotland speaks of the need for strict economy and of shortage of staff. In economic terms the priority accorded to local health authorities under the National Health Service can be judged from the fact that in Scotland during the last financial year their services accounted for about a fortieth of the total Government expenditure on the National Health Service and only about a twenty fifth of the cost of the hospital service.

The committee goes on to emphasise the need for research and statistical inquiry in public health work. The objective is laudable, but the difficulties are great. Fifty years ago simple vital statistics gave a clear lead to useful action, but not today. Thus among the subjects that the committee recommends for study are accidents, rheumatism, peptic ulcer, and heart-disease, and health authority records and administration are not usually designed to permit difficult investigations of this sort. It is not fortuitous that, with some notable exceptions, little research has come from the public-health service in the last few decades: the service has simply not developed along lines that encourage research.

One field where hard thinking is urgently needed is the relation of the local health authorities to the other components of the health service. If the medical officer of health is meant to act as the coördinator—as he is sometimes told—then his position should be left in no doubt; it should not be left to the chance of personalities. Fortunately the National Health Service has helped to bring together the medical officer of health and the general practitioner, who formerly seemed to face each other as rivals across the maternity and child welfare services. The opportunities for collaboration have been greatly enlarged now that the local health authority must provide health visitors, midwives, district nurses, and home helps, all of whom can directly aid the family doctor. How, in return, the practitioner is to contribute more to preventive medicine is uncertain. Many local health authorities have tried inviting practitioners to participate in the work of antenatal and child welfare clinics, and in school health work, but it is not always easy to reconcile the punctual attendance necessary for such work with the busy and irregular day of general practice. It seems that the general practitioner should be ideally placed for the practice of preventive medicine and health education whether he collaborates in clinic work or not "his intimate knowledge of the living conditions of his patients and of their medical histories and personal worries gives him unique opportunities for the dissemination of information and practical advice on these subjects"[3] Possibly we should even aim at making him the main exponent of preventive medicine But there is some danger in confusing what ought to be with what is The practice of preventive medicine and health education calls for an unhurried approach which is at present too seldom possible in general practice Moreover, there is a real difference between a clinical approach and a preventive approach When the two are combined the result is medicine at its best, but most general practitioners are not in a position to give such a service, and both medical training and the conditions of practice will have to be reoriented if such a happy position is to be achieved

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[1] Reports of the Department of Health for Scotland and the Scottish Health Services Council 1950. H.M. Stationery Office 1951.

[2] What Local Authorities can do to promote Health and Prevent Disease. H.M. Stationery Office 1951.

Annotations

THE SCHOOL DENTAL NURSES

THE *British Dental Journal* for Jan 1 contains a long article, by a correspondent, analysing the New Zealand School Dental Nurses Scheme With the aid of statistics, graphs, and selective quotations from various recent reports on the scheme, this correspondent succeeds in proving disadvantages in its operation which are not in fact denied by advocates of the use of dental ancillaries here The case for the legalisation of dental nurses is not destroyed by the "wastage" in the New Zealand scheme, caused by nurses retiring rom the service, to marry or for other reasons, often ly a few years after completing their training indeed we cannot even be sure that there would be similar wastage if a similar scheme were established in this ountry The reasons which persuade a woman to at work after marriage are functions of the eral economic situation, and in a time of inflation nd continually rising cost of living the woman who has undergone extensive training usually has strong incentives to continue to employ her acquired skill, in order to contribute to the family income We may fairly guess that in this country a dental nurse trained under the scheme proposed in the Dentists Bill would remain long enough in the service to justify the expense of her training, even if this is not always so in New Zealand. This argument based on economic "wastage" would apply at least as strongly to women dental surgeons, whose training is more expensive, yet we seldom hear the suggestion that the numbers of women admitted to the dental schools, which increases year by year, should for this reason be reduced Actually the school service is coming to rely more and more on women dentists, the staffs of some local authorities being almost entirely feminine Many women dentists take full time appointments in the school until they marry, after which they continue on a part-time basis, and without their services the condition of the school service would indeed be parlous

If it were possible to increase the numbers of dentists qualifying from the schools, and then to persuade enough of them to enter the school service, the problem of children's dentistry would be solved and we should not have to consider whether it is or is not desirable to train dental ancillaries But it is probably impossible to increase the number of qualified dentists to this extent without disastrously lowering standards in the selection and training of students The tutor at a dental school in this country lately found that, of a score of studen admitted for a degree course, only two graduated wit out failing in at least one examination, and that the oth students between them took the equivalent of 32 academ years more than they should have done, to complete th course Almost certainly, if many more students a to be drawn into the schools, examination standar will have to be lowered to allow the less talented pass To us it seems that the real threat to th status of the dental profession, and of the service renders the community, lies in the lowering of standar of admission to its ranks rather than in the employme of ancillary workers, under professional supervisio as the Dentists Bill proposes

Elsewhere in the same issue, the *British Dental Journ* reports the Minister of Education as saying that 30 dentists are required in the school service to bring up to establishment This establishment would almo certainly be unable to provide a comprehensive servic and a minimum of 5000 might be a more realist estimate The conservative figure of 3000, howeve is roughly four times the present strength of the servic Moreover we must suppose that the total strength of th profession would also have to be increased—perha even quadrupled—before 3000 school dentists could recruited, for there is no reason to suppose that higher proportion would be attracted to the exactin work of children's dentistry than has been attracte in the past In this country there is no more tha one dentist to 4400 of the population, whereas in Ne Zealand the proportion is one to 2890, and in the Unite States one to 1727, which suggests that the professio could be increased to almost four times its present si and still be almost wholly absorbed in treating th adult population

One of the strongest arguments in favour of dent nurses is that they are recruited exclusively for th school service and receive a restricted training specialists in routine children's dentistry They ha no professional standing and cannot therefore "*dilute* the profession or threaten its status Provided th degree of professional supervision of their work adequate, the public need have no fear that schoo children will get an inferior service at the hands of th dental nurse No investigator of the New Zealan service has suggested that the quality of the treatme given by the dental nurses is such that the scheme shoul be abandoned

The central weakness of the *British Dental Journ* article is its author's assumption that we have a choic now or in the forseeable future, between a children's service recruited entirely from qualified dentists and one mainly staffed by school dental nurses, of which the former *method would in the long run be more economical.* No such choice exists We have to choose between the present lamentable state of affairs and an experiment based on the experience of the New Zealand scheme, which has, after all, been in operation for thirty years, apparently to the satisfaction of the dental profession as well as the general public

SEPTEM CONTRA PIJPER

THE medieval scholars are said to have employed the summer in travel and reserved their disputations for the darker days Perhaps it is because winter is upon us that the argument on the nature and purpose of bacterial flagella has come to life again

Weibull[1] is the latest to take the part of those who do not believe that flagella are mere passive appendages with the help of X ray diffraction analysis he has demonstrated that they cannot be mucoid or polysaccharide in composition In his reply, the redoubtable Pijper[2] accepts the challenge and takes the opportunity to deal out a few strokes at his other opponents. His first point, and a good one, is that he always talks about the flagella of proteus and salmonella: what others have seen in spirilla are no concern of his. He admits that his flagella are not mucoid but of a substance allied to keratin: the admission does not amount to much, since, on the analogy of what we thought we knew five years ago, a mucoid composition was a fair guess. Where Pijper has the advantage is in being able to use the sunlight of Pretoria for dark ground illumination. Others have observed phenomena which he cannot repeat, but in circumstances which differ from his in many ways. We still believe that the kernel of his argument lies in his observation of motility in bacteria deprived either mechanically or by cultural devices, of their flagella. Weibull[3] returns with the comment that Pijper's explanation of Weibull's findings "cannot on chemical grounds be allowed."

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[3] Birmingham Executive Council memorandum prepared for e Executive Councils' Association Dec 18, 1951

[1] Weibull, C *Nature Lond* 1951, 167, 511

[2] Pijper, A *Ibid*, p 749

This disputation has gone on a long time. We suggest that the learned doctors should, following tradition, migrate for a season to Pretoria and there enjoy sunlight microscopy and a climate which has the reputation of bracing the body and quickening the wits.

STETHOSCOPE TUBING

WE seldom change our stethoscopes until they fall to pieces; but we occasionally renew the rubber tubing when it becomes outrageously decrepit. Do we then select the most suitable kind of tubing or simply accept the first that is offered? Rappaport and Sprague,[4] of Boston, report an investigation from which they conclude that we are not getting full volume for money from our tubing. The internal diameter of $^{3}/_{16}$ in, which is usual, is not, they say, the most suitable for conducting the sounds we want to hear. Though many observations have been published on the efficiency of different patterns of stethoscope, this is, we believe, the first precise study of this particular point.

In an earlier paper[5] they demonstrated that the amplitude of the pressure changes conducted to the ear during auscultation was inversely proportional to the internal volume of the stethoscope. In other words, the shorter the tubing and the finer its bore the better. They also pointed out that friction between the walls of the tube and the column of air within damped the vibrations of the column and that this friction increased as the calibre of the tube diminished. A compromise between frictional resistance and volume would, they suggested, give the ideal diameter, but at that time they had no instruments capable of measuring sound changes with the accuracy necessary to determine this diameter. A delicate sound pressure meter has now been used and their suggestion is confirmed. Those heart-sounds which are particularly elusive—e.g., the early mitral and the low pitched basal diastolic murmur, and the third heart-sound—fall within the low frequency range (20–115 cycles per sec.). Within these limits an internal diameter of $^{1}/_{8}$ in. gave an appreciably louder output for a given length of tubing than the more usual $^{3}/_{16}$ in. A tube with a bore of $^{3}/_{64}$ in. started well but its efficiency fell away rapidly at frequencies over 40. The $^{1}/_{8}$ in. tube retained its supremacy until frequencies were reached which have little importance in cardiac auscultation. All but the most highly pitched respiratory sounds were also conducted with advantage.

Rappaport and Sprague suggest that 10 in. is the optimum length—anything shorter being awkward to use. The fashionable instruments of today have 20 in. of tubing or more; indeed some are so long that, after reading the Boston paper, it is hard to understand how their owners hear anything at all. No mention is made of the instrument which has different lengths of tubing to each ear, as proposed by a correspondent some months ago.[6] For a given length and calibre, peaks of sound intensity arise at certain resonance frequencies. If the two ears have air columns of different length between them and the chest, the chances of getting amplification by resonance are greater. In sum, therefore, we must wear our stethoscopes with a difference—shorter by a foot, narrower within by $^{1}/_{16}$ in., and even perhaps asymmetrically.

TUBERCULOSIS NURSING AND THE TEACHING HOSPITALS

A CURRENT impression that teaching hospitals are not making much contribution to the nursing of the tuberculous is unfounded. Of the 12 London teaching hospitals all but 2 now arrange to transfer nurses to sanatoria for a period of training or else train them in their own tuberculosis wards. Matrons had to overcome some natural reluctance before they could agree to the transfer of their nurses to sanatoria: they feared lest lip service only would be paid to the idea of student status and that these young people might merely be used as extra pairs of hands. Once this fear was allayed, however, they were ready enough to enter into transfer schemes or to make other arrangements which gave their nurses the necessary experience.

Thus King's College Hospital has, since 1949, sent 6 nurses every three months to Midhurst, and during 1951 has also been sending 10 nurses every three months to Preston Hall. These are heavy obligations to fulfil and the position will probably be reviewed in 1952. The Middlesex Hospital, since 1950, has been sending 20 nurses every three months to Harefield. Charing Cross Hospital also sends nurses to this sanatorium for three monthly periods. St. Mary's Hospital sends 3 student and 3 State-registered nurses at a time to Clare Hall for two monthly periods, and nurses who become keenly interested in the work can stay a further two months if they wish. St. Thomas's sends 10 nurses every three months to the King George V Sanatorium at Godalming. Guy's nurses can volunteer to go to Grove Park Hospital, to nurse a block of 53 beds: student nurses stay there two months, and State-registered nurses six months or a year in order to take the Tuberculosis Association certificate.

Other hospitals are able to give their nurses good experience in their own tuberculosis wards. Thus the London Hospital has three wards of 18 beds each at its Brentwood Annexe, and nurses are transferred there for three months training. St. George's has opened a 50-bed unit at the Grove Hospital and sends students there for two to three months training. University College Hospital is able to give nurses some experience of tuberculosis in its 20 bed ward. Before 1948 this hospital used to second third year nurses to Midhurst, and the plan worked very well. The Royal Free has only 18 beds, and hopes in the coming year to supplement the tuberculosis training of its nurses by arranging to send them to a sanatorium—probably Colindale. Of the two hospitals which have not so far arranged to give their nurses any tuberculosis training at all, Westminster is planning to transfer them for three monthly periods, probably to the country branch of the London Chest Hospital, and St. Bartholomew's is engaged in preliminary discussions.

The National Association for the Prevention of Tuberculosis (N.A.P.T.) have already made recommendations[7] about the secondment of nurses to sanatoria. They would like to see the practice greatly extended so that every general hospital had a regular arrangement to send all student nurses for a three monthly period to a suitable institution; and this, they say, should be regarded not merely as a device for staffing the sanatoria, but as valuable training for the staffs of the general hospitals (which have their own cases of tuberculosis) and for individual nurses The London teaching hospitals, by transferring 200–300 nurses to sanatoria for periods of two to three months every year, and by training at least as many in their own tuberculosis wards, are ensuring that their new generation of nurses will be well informed about this troublesome and interesting disease, and some of these nurses will certainly be drawn to make their careers among tuberculous patients If all the general hospitals in the country made this provision the problem of staffing tuberculosis beds would be very largely solved, and the spread of information about tuberculosis would be much more rapid Nurses are good public-health teachers in private life, and by their informed attitude to the disease they could help to educate the public in methods for its control

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[3] Weibull, C. *Ibid*, p. 750.

[4] Rappaport, M. B., Sprague, H. B. *Amer. Heart J.* 1951, 42, 605.

[5] Rappaport, M. B., Sprague, H. B. *Ibid*, 1941, 21, 257. See *Lancet*, 1941, ii, 610.

[6] Smyth, N. *Lancet*, 1951, i, 171.

[7] N.A.P.T. *Bulletin*, 1951, 14, 631.

ENDOCARDIAL FIBROSIS

CARDIAC enlargement, it is now clear, is not inevitably associated with some readily defined cause, such as rheumatism, syphilis, acute or subacute endocarditis, hypertension, coronary disease, or congenital morbus cordis Gray[1] has lately reviewed an interesting group of cases of congestive heart failure of insidious onset in young adults in which the main features were cardiac enlargement, low blood-pressure, and usually sinus rhythm, the electrocardiogram showed low-voltage curves with inversion or flattening of the T wave, embolic phenomena were common Pathologically, the striking feature was a thickened and opaque endocardium, with fibrous tissue extending into the subendocardial myocardium Mural thrombosis was almost always present over the affected endocardium, which was commonly most involved in the apical portion of the ventricles

According to Gray, this sydrome of endocardial fibrosis was first described in 1901 by Josserand and Gallavardin,[2] who termed it "*primary subacute myocarditis*" Isolated cases were later recorded under such titles as "myocarditis perniciosa,"[3] "endocarditis parietalis fibroplastica with eosinophilia,"[4] "cardiac hypertrophy of unknown etiology in young adults,"[5] "diffuse isolated myocarditis,"[6] and "chronic fibroplastic myocarditis"[7] In 1946 an entirely new light was thrown on this disorder by Bedford and Konstam,[8] *in an account of 40 cases of "unexplained heart failure in African troops, mostly from West Africa, serving in the Middle East"* Necropsy in the 17 fatal cases revealed healthy coronary arteries, no significant valvular disease, and subendocardial fibrosis with organised antemortem clots in the ventricles Davies[9] has since reported 36 instances of this disorder in 3759 necropsies at Kampala Of 229 Africans dying of congestive heart-failure, nearly 10% were found to have endocardial fibrosis, most of the deaths occurred in adolescence or early adult life Edge[10] described a further case in a European whose illness began while he was receiving antisyphilitic arsenical treatment in West Africa, and Gray himself adds 2 new cases, in white men, aged 40 and 36, who developed congestive failure in Nigeria

This association with tropical Africa suggests that *either nutritional factors or parasitic infestation may* be involved in the ætiology A nutritional cause seems unlikely The disease has been found in the tropics among white men, who were presumably living on a satisfactory diet and who, as in Gray's cases, showed no evidence of malnutrition, and Bedford and Konstam point out that their patients were all well nourished Similarly, no case has been reported to respond t vitamin B_1, indeed clinically and pathologically th syndrome is quite different from beriberi In favour of parasitic ætiology is the quite common finding of a eosinophilia In one of Gray's cases, for instance, ther was an eosinophilia of 51%, and in the other of 18% both patients had been suspected of having had loa loa Bedford and Konstam also remark on an eosinophili in several of their cases It would appear, therefore, tha parasitic infection is the most likely cause, and th question arises whether the condition is a direct outcom of such infection or is due to a resulting allergic reaction the common eosinophilia fits in with this secon possibility[11] Gray, impressed by the resemblance of th lesions to those of scleroderma and disseminated lupu erythematosus, suggests that endocardial fibrosis ma belong to "the ill-defined category of the collage diseases" A further possible clue in the ætiologica tangle is Davies's[9] observation that in three of h cases the adrenals were unusually large

The next step, perhaps, is to observe the effect o A C T H or cortisone on these cases Finally—a practica point of some importance—several of the reported case have been submitted to paracentesis pericardii on th assumption that the cardiac enlargement was due to pericardial effusion

AUTOSENSITISATION IN SKIN DISEASES

IN developing a theory of autosensitisation in sk diseases, three South African workers[12] suggest tha tissues may become *auto-antigenic "following alteratio* of the cells by toxins, chemical or physical agents or b intracellular parasites" By means of the Coombs tes *they have found sensitised red cells in three cases o* acute disseminated lupus erythematosus and two case of chronic discoid lupus erythematosus, and in cases o dermatomyositis, scleroderma, and Raynaud's phenomenon They suggest that the sensitised red cells may b caused to agglutinate in vivo, with resulting disturbanc of the capillary circulation (It seems more probable however, that the in-vivo effect of interaction of antige and antibody on the surface of the red cell would b hæmolysis) These workers also postulate a simila sensitisation of other mesenchymal cells They do no state what kind of allergic reaction they picture as takin place in the tissues, but presumably it is of the Arthu type This reaction is unlikely to be mediated b incomplete antigens[13] such as they have demonstrated

From the clinician's point of view, it is perhaps unfortunate that this study was not carried out on disease of more blatantly allergic origin than lupus erythematosus, in which moreover the detection of possible sites o "auto antigen" formation is often beyond normal clinica ability It has already been shown that material derive from "foci of infection" is antigenic on intraderma inoculation If we are to believe Storck,[14] the skin itsel *may harbour sensitising organisms, and a filtrate fro* cultures of these organisms causes eczematous reaction on patch-testing the patients from whom they wer derived Others have found that damaged epidermi produces an antigenic substance, which, it is thought, ma be carried in the leucocytes to distant sites[15] The possibility of an indirect effect is suggested by the work of Moncorps,[16] who showed that the threshold to contact sensitisers was lower in people with focal infection than in normals, and in 60% of cases in which the foci were successfully treated the threshold rose to the control level This is comparable with the observation that fungus infection of the skin seems to predispose to industrial dermatitis. Furthermore, Memmesheimer[17] described cases of food allergy in which cure followed the removal of focal infections

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[1] Gray I R *Brit Heart J* 1951, 13, 387
[2] Josserand F, Gallavardin L *Arch gén Méd* 1901, 188, 513
[3] Bolkan W S *Virchows Arch* 1931 282 46
[4] Loeffler W *Schweiz med Wschr* 1936 17, 817
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[6] Toreson W E *Arch intern Med* 1944 73, 375
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DEAFNESS FROM DIHYDROSTREPTOMYCIN

THE only common toxic effect of streptomycin is on the vestibular apparatus, leading to vertigo, usually with nausea or vomiting and ataxia. In the big series, now amounting to 10,000 cases of tuberculosis treated for some years on behalf of the U S Veterans Administration[18] vertigo developed in 80% of the patients given a streptomycin dosage of 2 g or more daily for 120 days The neurotoxic action seems to be confined to destruction of the vestibular portion of the eighth nerve or its end-organ The incidence of vertigo can be reduced by shortening the course of streptomycin or better still by lowering the dosage, and apparently without affecting the drug's therapeutic efficacy On 2 g daily for 60 days the incidence of vertigo was 63%, on 1 g daily for 120 days it fell to 8%, on 0 5% daily to 5 8%, and the latest report on 383 cases given 1 g twice a week shows an incidence of only 3 4% The finding that 1 g twice a week was as effective as daily doses and less liable to cause vertigo arose out of the search for ways of preventing the production of streptomycin resistant organisms.[19] At the same time the Veterans Administration observers were testing other drugs, either as substitutes for or supplements to streptomycin In the summer of 1948 they began a clinical trial of dihydrostreptomycin, alternate patients being given this drug and streptomycin The dihydro compound was claimed[20] to be less toxic than the parent substance, though in large doses it produced all the toxic effects of streptomycin At 2 g a day it was decidedly less *toxic than streptomycin* but at 1 g daily the difference was less marked it caused vertigo in 3% of cases, against streptomycin's 8% After 800 cases had been studied it became clear that streptomycin was giving the better therapeutic results and a new toxic manifestation now appeared in the dihydro cases—an inner-ear deafness

The incidence of deafness may be high Dr Don and Miss Gregory, who review the published reports on page 72, quote an American series of 82 patients treated with dihydrostreptomycin for 2–18 months 32 of whom became deaf Cathie and Garrow[21] after treating 40 cases of tuberculous meningitis with streptomycin plus streptokinase, changed over to the dihydro form at the beginning of 1950 since when 14 patients have been treated. They report that 23 of the first 40 have survived but only 3 of the last 14 and whereas none of the streptomycin series has been left with any deafness, 2 of the 3 survivors treated with dihydrostreptomycin are deaf In this series therefore, dihydrostreptomycin seemed decidedly less effective, as well as liable to cause auditory effects. Disturbance of the labyrinthine mechanism by streptomycin is immediately detectable from the symptoms, but the deafness from the dihydro drug often does not appear for several months and may progress long after the drug is stopped The delay may be explained in some cases by extension of the deafness from high tone only into the speech range

The toxic action of dihydrostreptomycin was at first ascribed to overdosage but when the daily dose was reduced from 3 to 2 g and even 1 g damage to the auditory apparatus still occurred Moreover, though loss of labyrinthine function is largely and rapidly compensated by the visual and proprioceptive senses there is no parallel compensation for the deafness, which is of inner-ear type and apparently permanent The exact site of the damage is not certain though there is some pathological evidence that it is in the end-organ Information on this point might be obtained by measuring the loudness recruitment of these patients; Dix et al.[22] have shown that, in cases of inner-ear deafness of moderate severity which affects one ear more than the other, such measurements will reveal whether the lesion is in the end-organ or in the neural connections. In 26 cases of tuberculosis excluding meningeal and miliary forms, treated with dihydrostreptomycin at University College Hospital, Dr Don and Miss Gregory have found 3 cases of clinical deafness and 1 of high tone loss, showing that the toxic effect is not confined to cases of meningitis though most of the examples have been in that condition The possibility that impurities in the drug are responsible cannot be excluded, and the sulphate seems to be definitely less dangerous than the hydrochloride. Nevertheless, since neither form can show any convincing superiority over streptomycin, there seems to be good reason for discarding dihydrostreptomycin altogether

BULGES IN THE BOWELS OF DRUG ADDICTS

LARGE dilatations in various parts of the alimentary tract in drug addicts have lately been described by Hillemand and his colleagues[23] in Paris The 40 patients in their series had been addicted to diamorphine (most frequently) morphine itself or preparations containing morphine, usually for many years The dilatations, revealed radiologically were most common in the colon (26 cases) but were found in the duodenum in 7 cases, the stomach in 4 the œsophagus in 3 and the rectum in 2 cases. Constipation was present in only half the patients with megacolon and some of the patients with radiologically normal colons were equally constipated Some of the addicts with dilatations complained of upper abdominal pain, but as a rule they had no characteristic symptoms. When the drugs were withdrawn the dilatations disappeared, returning if the addict relapsed

It is not easy to see how these dilatations are produced A single injection of morphine in a normal person (i.e., a non-addict) increases muscular tone throughout the alimentary tract and reduces the rate of propulsion of the intestinal contents[24,25] The action of diamorphine has not been worked out from this aspect, but Hillemand et al found that it had the same effect as morphine in causing dilatations. The relaxed state of the intestinal muscles might be a result of the huge doses of morphine or its preparations that addicts take to obtain the desired central nervous actions. Incoördinated movements in different segments of the bowel might result from disturbances of autonomic control like those described by Bodian and his colleagues[26] in Hirschsprung's disease In that condition absence of the myenteric plexuses,[26] which belong to the parasympathetic system in a distal section of the colon causes great distension of the proximal colon The objection to the view that large doses of morphine exert a reversible depressant action on the myenteric plexuses is that Bodian et al showed that megacolon can occur without there being any histological abnormalities in these plexuses. The mechanisms involved in the dilatations of other parts of the alimentary tract are equally obscure

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Special Articles

THE USE OF THE SANATORIUM BED

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In reply to a parliamentary question the Minister of Health recently stated that, since the implementation of the National Health Service Act, 3500 additional beds had been made available for the treatment of tuberculosis In spite of this increase waiting-lists continue to embarrass hospital boards, and, at a time when antibiotics and improving surgical techniques are revolutionising treatment and prognosis in early pulmonary tuberculosis, in most regions the interval between diagnosis and admission is said to be 7–9 months (Central Health Services Council 1951) The demand for beds is likely to continue, for, although mortality-rates are falling, improved methods of case finding are maintaining a high level of notification Unfortunately, building restrictions and staffing difficulties make any immediate and substantial expansion of sanatorium accommodation unlikely, and it is therefore essential that all available beds should be used to the best advantage

There is reason to believe that in sanatoria, as in hospitals for the chronic sick, patients are sometimes admitted, or retained after completion of treatment, for social rather than medical reasons This is recognised by the Ministry of Health (1950), which urges " a check on any tendency to retain patients in institutions any longer than is justifiable " and recommends that

> "the use of beds should be limited as far as practicable to recoverable cases Patients for whom further treatment is unlikely to be of avail, but whose condition or circumstances do not permit of discharging them should if possible be provided for in accommodation distinct from that for cases under active treatment "

Although the reasons for this recommendation are easily understood, there are as yet no factual data of the kind needed to guide policy The investigation here described was therefore designed to answer two questions

(1) What proportion of patients now occupying sanatorium beds need hospital care ?

(2) What are the medical requirements and social circumstances of patients not needing hospital care ?

Reliable answers to these questions will provide a basis for planning a more rational use of the sanatorium bed

MATERIAL

The material consists of all patients occupying beds in the four sanatoria (bed complement 821) which provide accommodation for tuberculous patients in the Birmingham area

After a small pilot survey, a record card* was designed so that information could be assembled under two headings, " social " and " medical " The social data were collected by a social worker who interviewed the patient in the ward If the patient was too young to answer questions reliably, or too ill to be interviewed, a relative was questioned on visiting day Occasionally a home visit was necessary The medical section of the record card was completed by the physician in charge of the patient Most of the information asked for was objective, but a few questions demanded a personal judgment from the examining physician, for example, it was necessary for him to decide whether in the light of their medical and nursing requirements patients could leave hospital if a suitable home were provided To ensure reasonably uniform answers *to these questions*, one of us (J E G) met and discussed the survey with the physicians concerned, and remained in close touch with them throughout the inquiry Each card was inspected on completion and, if necessary, returned for attention to inconsistencies and omissions

TABLE I—PROPORTION OF SANATORIUM BEDS OCCUPIED

Sanatorium	Beds available		Beds closed		Total no of beds
	Occupied	Not occupied	Repairs, &c	Lack of staff	
Yardley Green	374	21		18	413
Romsley	96	7	10	7	120
West Heath	185	12	13		210
Salterley Grange	74	4			78
Total	729 (*89*%)	44 (*5*%)	23 (*3*%)	25 (*3*%)	821

The number of patients interviewed (729) was determined by the number in each ward when the first patient was examined (There was a considerable turnover of patients during the three months that the survey was in progress—from Jan 22, 1951, to May 3, 1951) This means that of the 821 beds 92 (11%) were unoccupied only 25 of them were closed through lack of staff (table I) Access to sanatorium beds for the Birmingham population (a little over 1,000,000) is somewhat easier than for the *country as a whole, since the average interval* between notification and admission was about 10 weeks (males 9 3, females 10 9), which compares favourably with the general figure of 7–9 months mentioned above At the beginning of the inquiry the waiting-list for sanatorium treatment was 116, and at the end 119

AGE DISTRIBUTION

The age distribution of patients is shown in table II Males on the average were a few years older than females (mean age 29 8 and 24 4 years respectively) and 60% of all patients were aged 20–39 More than 90% of the patients had respiratory tuberculosis, a few of them with *non-respiratory complications* (usually orthopædic) Patients with non-respiratory tuberculosis are usually treated in orthopædic and general hospitals, and so are not commonly found in sanatoria

An attempt has been made to relate the number of sanatorium beds occupied by patients with respiratory

TABLE II—AGE AND SEX OF SANATORIUM PATIENTS

Nature of lesion	Age of males (yr)								Age of females (yr)							
	0–	10–	20–	30–	40–	50–	60 or over	Total	0–	10–	20–	30–	40–	50–	60 or over	Total
Respiratory only	21	36	124	83	49	17	8	338 (*84*%)	16	50	131	52	19	9	8	285 (*86*%)
Non respiratory only	2	2	6	3		2	1	16 (*4*%)	2	7	5	2	1		2	19 (*6*%)
Respiratory and non respiratory	8	9	7	11	1	1	1	38 (*10*%)	2	3	8	1		2		16 (*5*%)
Non tuberculous or unknown		1	5		1	1		8 (*2*%)		1	2	1	2	3		9 (*3*%)
Total	31 (*8*%)	48 (*12*%)	142 (*36*%)	97 (*24*%)	51 (*13*%)	21 (*5*%)	10 (*2*%)	400	20 (*6*%)	61 (*19*%)	146 (*44*%)	56 (*17*%)	22 (*7*%)	14 (*4*%)	10 (*3*%)	329

TABLE III—AGE-SPECIFIC BED-OCCUPATION RATES (RESPIRATORY TUBERCULOSIS) COMPARED WITH MORTALITY RATES

—	Age of males (yr)								Age of females (yr)							
	0–	5–	15–	25–	35–	45–	55 or over	Total	0–	5–	15–	25–	35–	45–	55 or over	Total
Sanatorium patients*	11	25	72	85	50	31	17	291	9	20	99	96	27	11	11	273
Related civilian population (Registrar General 1949)	53 185	75,057	55 104	91,003	88 334	65,870	87,851	516 414	50,543	73 433	73 652	92 976	87,337	74 725	117,389	569,586
Bed-occupation rates (per 100 000 pop)	21	33	131	93	57	47	19	56	18	27	134	103	31	15	9	48
Age-specific death-rates (per million) from respiratory tuberculosis (England and Wales, 1949)	33	9	253	496	591	860	901	504	33	19	6[illegible]3	623	348	253	218	301

* Excludes non Birmingham residents patients transferred from the Forces and patients without respiratory tuberculosis.

tuberculosis to the population from which they were drawn (table III) The result is not altogether satisfactory since the figures exclude patients in general, orthopædic, pædiatric and mental hospitals It has also been necessary to exclude non Birmingham residents (60 males and 25 females) and patients whose tuberculosis was discovered in the Forces (35 males and 3 females) since estimates of age and sex distributions of the related population (Registrar General 1949) exclude non-civilians.

With these reservations the sanatorium bed-occupation rate for respiratory tuberculosis (all ages) is given as 0 5 per 1000 related population It is somewhat surprising, in view of the well known age difference in sex mortality that the age-specific bed occupation rates for the two sexes are in close agreement

Clearly if the best possible use is to be made of the limited number of sanatorium beds admission to and retention in the wards must be determined by medical and nursing requirements, rather than social circumstances.

Medical Attention Required

The physician in charge of the ward was asked to estimate how often each patient needed to be seen by a doctor This bore little relation to the medical attention received since as in all hospitals each patient was seen at least once a day by a physician The results of this assessment are given in table V Needless to say, all the patients required some medical supervision but a visit once a week or less frequently would have met the needs of about a third of them

TABLE IV—TREATMENT RECEIVED SINCE ADMISSION

Medical treatment	Surgical treatment					Total
	Artificial pneumothorax and pneumo peritoneum	Thoracoplasty and resection	Orthopædic	Other	None	
Streptomycin and p-amino-salicylic acid	125	27	28	19	250	449 (62%)
Other			6		14	20 (3%)
Sanatorium régime only	31	32	27	17	153†	260 (36%)
Total	156 (21%)	59 (8%)	61 (8%)	36 (5%)	417 (57%)	729

45 waiting for operation. † 28 recently admitted (duration of stay less than 2 weeks).

MEDICAL AND NURSING REQUIREMENTS

In the past when there was little or no specific therapy for pulmonary tuberculosis the main function of a sanatorium was isolation of the infections, admission being commonly determined by social circumstances. Today new methods are transforming sanatoria into treatment hospitals concerned with stabilisation arrest or cure of tuberculosis An analysis of treatment received during the present admission illustrates this change in the character of sanatorium work (table IV) Most of the patients had received active medical or surgical treatment, which could be given satisfactorily only in a fully equipped hospital only 153 (21%) had had no active treatment and 73 of these either were waiting for operation or had been in sanatorium less than two weeks.

Nursing Attention Required

Whether a tuberculous patient can be said to need hospital care must depend as much on nursing as on medical requirements. Here it is necessary to make a distinction between skilled and simple nursing Under skilled nursing have been included tasks for which training and skill are required—e g care of the acutely ill, injections assisting at artificial pneumothorax and pneumoperitoneum refills, attending to postoperative patients and supervising patients in orthopædic appliances—and under simple nursing personal services for which only an elementary nursing knowledge is needed —e.g., lifting washing feeding and dressing

Table VI shows that rather more than two thirds of the patients required skilled nursing more often than once

TABLE V—MEDICAL ATTENTION REQUIRED

Sex	Daily	More than once a week but not daily	Weekly	Fortnightly	Monthly or less	Total
Males	160 (40%)	118 (30%)	50 (12%)	13 (3%)	59 (15%)	400
Females	129 (39%)	91 (28%)	53 (16%)	1[illegible] (4%)	36 (11%)	329
Total	289 (40%)	209 (29%)	103 (15%)	2[illegible] (3%)	95 (13%)	729

TABLE VI—SKILLED NURSING REQUIRED

Sex	Daily	More than once a week but not daily	Weekly	Fortnightly	None	Total
Males	242 (*61%*)	28 (*7%*)	26 (*6%*)	6 (*2%*)	98 (*24%*)	400
Females	209 (*64%*)	8 (*2%*)	18 (*6%*)	1	93 (*28%*)	329
Total	451 (*62%*)	36 (*5%*)	44 (*6%*)	7 (*1%*)	191 (*26%*)	729

a week (62% daily) and 7% at longer intervals (usually at the time of artificial pneumothorax refills), 191 patients (26%) needed no skilled nursing, and of these only 47 required simple nursing (The total number of patients who needed simple nursing was much larger than this, since it was necessary in almost all cases which merited skilled attention) No nursing of any kind was needed by 144 patients (about 20% of the total)

CLASSIFICATION OF PATIENTS ACCORDING TO THEIR NEEDS

In a parallel investigation of chronic sick in hospital, patients were classified (with a view to disposal) on the basis of their medical and nursing requirements (Lowe and McKeown 1949) It was recognised, however that for the tuberculous the same procedure might not be acceptable, unless checked by a medical assessment of each case Physicians were therefore asked to consider whether each patient could leave hospital if a suitable home were provided This assessment was based on full knowledge of each patient's clinical condition as well as of his medical and nursing requirements

TABLE VII—PHYSICIANS' CLASSIFICATION OF PATIENTS

Sputum at survey	Patients needing hospital care	Patients not needing hospital care, but requiring			Total
		Skilled nursing	Simple nursing only	No nursing	
Positive	283	4	12	51	350 (*48%*)
Negative	286	19	7	67	379 (*52%*)
Total	569 (*78%*)	23 (*3%*)	19 (*3%*)	118 (*16%*)	729

The results are given in table VII It was considered that 160 patients (22%) could have left hospital if a suitable home had been available In general the physicians' classification into hospital and non hospital groups divided patients according as they required or did not require frequent medical attention or skilled nursing The important exceptions were 23 patients in the non-hospital group who needed skilled nursing, 3 of them as often as once a day (2 diabetics on insulin and 1 patient with a small sternal sinus needing daily dressings, it was thought that the necessary injections and dressings could have been given by a district nurse) The other 20 patients needed skilled attention only at the time of their artificial pneumothorax refills, and this could be provided at chest clinics

We conclude that 22% of the sanatorium beds were occupied by patients who were not in need of hospital care and could be cared for more economically elsewhere if suitable accommodation were available We t now to a more detailed examination of the two gro identified above

Patients Needing Hospital Care

The type of patient considered suitable for hosp care is indicated in table VIII More than half of th (54%) were acutely ill or had unstable pulmonary lesio nearly all these patients were receiving daily injecti of streptomycin and *p* aminosalicylic acid, and general care required (close medical supervision and skil nursing) differs in no important way from the c required by acutely ill patients in general hospitals further 177 (31%) were either waiting for operation receiving immediate postoperative care (thoracoplas adhesion section, lung resection, phrenic crush, &c.) The remaining 87 (15%) were being investigated or needed close supervision of orthopædic conditions The wearing of a spinal plaster or other appliance was not in itsel considered a sufficient reason for occupying a hospital bed, and most orthopædic patients included here had complications (spinal abscess, renal infection, &c.) o still needed skilled control of their plasters and appliances There can be little doubt that these 569 patients neede the facilities of a general hospital

Patients Not Needing Hospital Care

The nature of the accommodation which would b needed to enable the 160 patients to leave hospital largely determined by their mobility, sex, and infectious ness This information is presented in table IX It wil be noted that 11 patients were bedfast 5 were wearing orthopædic appliances but no longer needed close super vision, and 6 had untreatable fibroid phthisis not in the terminal stage Most of the patients with positive sputum had long standing untreatable disease of the lungs Most of the sputum-negative patients had pulmonary lesions which were stable as a result of treat ment, a few had minor orthopædic disabilities necessi tating only occasional medical supervision Mention has

TABLE VIII—REASONS FOR WHICH 569 PATIENTS WERE CONSIDERED TO NEED HOSPITAL CARE

Reason	Males	Females	Total
Acute illness (including unstable lesions)	167	138	305 (*54%*)
Investigation (including assessment for operation)	22	20	42 (*7%*)
Close orthopædic control	30	15	45 (*8%*)
Awaiting operation	26	27	53 (*9%*)
Postoperative care	58	66	124 (*22%*)
Total	303	266	569

TABLE IX—MOBILITY OF 160 PATIENTS CONSIDERED NOT TO NEED HOSPITAL CARE

Sputum at survey	Males							Females						
	Bed-fast	Partly ambulant (hr)				Fully ambulant	Total	Bed fast	Partly ambulant (hr)				Fully ambulant	Total
		<2	2–	4–	6–				≤2	2–	4–	6–		
Positive	3	12	12	5	8	4	44 (*45%*)	2	10	2	4	2	3	23 (*36%*)
Negative	5	7	4	12	9	16	53 (*55%*)	1	5	5	10	10	9	40 (*64%*)
Total	8 (*8%*)	19 (*20%*)	16 (*16%*)	17 (*18%*)	17 (*18%*)	20 (*21%*)	97	3 (*5%*)	15 (*24%*)	7 (*11%*)	14 (*22%*)	12 (*19%*)	12 (*19%*)	63

already been made of 3 patients 2 with diabetes and 1 with a small sternal sinus, who needed daily skilled nursing

Let us now inquire why these patients were in hospital although not in need of hospital care. 40 (a quarter) were admitted for social reasons and had received no active treatment during their stay The remainder (120) were admitted for treatment, which was completed, but because of social circumstances had not been discharged Table x gives reasons for retention in sanatoria of the 160 patients as follows:

(1) About a fifth had no home, and were admitted from common lodging houses or unsatisfactory lodgings with which they had no further contact

(2) About half (52%) had a home which was unsuitable for the care of a tuberculous patient, usually because of overcrowding

(3) 16% had homes which were reasonably satisfactory in most respects but they could not be discharged because of lack of domestic service and occasionally, of simple nursing In some cases these services were needed only during the day time (usually when other members of the household were at work); but in other cases they were also required at night since the patient would be living alone

(4) In 17 cases discharge was pending or there was no apparent reason for further stay in hospital

TABLE X—REASONS FOR RETENTION IN SANATORIUM OF 160 PATIENTS CONSIDERED NOT TO NEED HOSPITAL CARE

Reason for retention	Males	Females	Total
No home	23	11	34 (21%)
Inadequate accommodation at home	52	31	83 (52%)
Inadequate domestic help	13	13	26 (16%)
Discharge pending	7	6	13 (8%)
No apparent reason	2	2	4 (3%)
Total	97	63	160

As might be expected, patients admitted or retained for social reasons tended to remain longer in hospital than those in need of skilled attention (table xi), about *a quarter of them had been in hospital more than a year* (Two widows without relatives, one aged 79 and the other 84, had been in sanatoria for 21 and 9 years.)

DISCUSSION

The tuberculosis service as it exists in this country today, is handicapped by its historical origins and by the haphazard manner in which it has developed Like other health and welfare services it has grown up piecemeal and will not fit tidily into the administrative framework created by the National Health Service Act As a result there are now gaps and inconsistencies in the service which cause unnecessary hardship to patients and delay the full application of present-day knowledge to the problem of reducing still high morbidity and mortality rates

Responsibility for institutional care of the tuberculous rested originally with the poor law authorities and large scale segregation began not in hospitals specially designed for that purpose but in 19th-century workhouse infirmaries Newsholme (1908) reported that a third of all deaths in London attributed to phthisis were in workhouses and workhouse infirmaries and he estimated that about a fifth of all known consumptives were segregated in these institutions Institutional care of the tuberculous began to lose its parochial associations when sanatorium benefit was offered under the National Insurance Act of 1911 as an insurance right, and between the two wars a comprehensive service was gradually built up under the major local authorities.

TABLE XII—HOME AVAILABLE TO PATIENTS AT TIME OF INTERVIEW

Sputum at survey	Own home			Lodgings	No home	Total
	Own bedroom	Bedroom shared				
		Own bed	Bed shared			
Positive	231 (66%)	32 (9%)	34 (10%)	16 (5%)	37 (11%)	350
Negative	241 (64%)	46 (12%)	39 (10%)	18 (5%)	35 (9%)	379
Total	472 (65%)	78 (11%)	73 (10%)	34 (5%)	72 (10%)	729

Until recently no effective chemotherapy and little surgery were available for the treatment of pulmonary tuberculosis. This is not the place to discuss the effectiveness of collapse therapy or of the traditional sanatorium régime (hygiene diet, and education) but it will be generally agreed that in the past a sanatorium had a social as well as a medical function When home conditions were bad it offered asylum with general nursing and good hygienic conditions, for the patient with early disease, the chronic case, the acutely ill, and the dying it made it possible to teach patients to minimise the risk of passing their infection to others and above all it afforded protection to the community by reducing the size of the reservoir of tuberculosis In these circumstances institutional care was rightly considered to be the responsibility of local authorities and inseparable from their domiciliary and clinic preventive welfare and diagnostic services

With the advent of more effective methods of treatment (both medical and surgical) there has been a shift in emphasis and the sanatorium has gradually become less concerned with segregation and education than with active treatment Thus, at the time of our survey four fifths of the patients investigated were receiving medical and surgical attention of a kind which required the facilities of a modern general hospital (table iv) Nevertheless the sanatorium continues to fulfil an important welfare function and quite a fifth of all patients here considered were in hospital for what may broadly be described as social reasons

TABLE XIII—HISTORY OF CONTACT WITH OPEN RESPIRATORY TUBERCULOSIS

Age (yr)	Place of contact			Total
	Home	Other	None or unknown	
Less than 15	59 (78%)	2 (3%)	15 (20%)	76
15 or more	257 (40%)	45 (7%)	334 (53%)	636
Total	316 (44%)	47 (7%)	349 (49%)	712*

* Excludes 17 patients either non tuberculous or with uncertain diagnosis (1 a contact).

In taking over sanatoria the hospital boards have evidently accepted two fairly distinct classes of tuberculous patient, and they must now decide whether it is possible to separate them It is clearly desirable that

TABLE XI—DURATION OF STAY IN SANATORIUM

Classification of patients	Duration of stay (mos)					Total
	0–2	3–5	6–8	9–11	12 or more	
Needing hospital care	293 (52%)	142 (25%)	60 (10%)	25 (4%)	49 (9%)	569
Not needing hospital care	36 (22%)	41 (26%)	27 (17%)	18 (11%)	38 (24%)	160
Total	329 (45%)	183 (25%)	87 (12%)	43 (6%)	87 (12%)	729

patients not in need of hospital treatment should leave hospital because (1) they could be accommodated more economically elsewhere, and (2) their retention delays treatment of cases which may deteriorate or transmit infection while waiting for admission

Obviously, if there are good facilities for segregation, the ideal place in which to care for these patients is at home Unfortunately, however adequate the domiciliary services of local authorities, in most cases home conditions are such that there is at present little prospect of discharge The unsatisfactory home circumstances of many patients considered in the inquiry are illustrated in table XII about 10% had no home, 5% expected to return to lodgings, and 21% had a home but would have to share a bedroom (10% a bed also) if they returned If confirmatory evidence is needed of the well known risk of home infection it is provided by the high proportion of all patients examined (44%) who gave a history of home contact with a known case of respiratory tuberculosis (table XIII) Of children aged less than 15 a history of contact was given by 78%

It is therefore clear, that, if hospital beds are to be reserved for patients in need of hospital care, alternative institutional accommodation will have to be provided for welfare patients Like frail ambulant and infirm elderly patients they lie in the field of ill-defined responsibility between local health authorities and hospital boards Moreover it should be noted that they are not a homogeneous group, and more than one type of accommodation may be required Eventually it will no doubt be necessary to define more specifically the respective responsibilities of the two authorities At present there is scope for local experiment, but, whether these hostels are provided by local authorities or by hospital boards, it is desirable that they should be closely associated with sanatoria

In conclusion it should be emphasised that this investigation does not measure the general need for hostel accommodation Heaf (1950) considers that in this country there are at least 137,000 patients with respiratory tuberculosis living at home, some of these undoubtedly could be cared for more satisfactorily in hostels It is therefore certain that, if a hostel service of good quality were made freely available, the demand would far exceed estimates based on patients already in sanatoria

SUMMARY

A medical and social survey was made of all patients (729) occupying beds in the four sanatoria which provide accommodation for tuberculous in the Birmingham area

The physicians in charge of the 729 patients thought that 569 (78%) of them needed hospital care for the following reasons acute illness or close orthopædic control (62%), awaiting or recovering from operation (31%), and investigation (7%)

It was thought that 160 (22%) of the 729 patients could have left sanatoria if a suitable home had been available 40 of them had been admitted for social reasons and had received no active treatment during their stay, the remainder had been admitted for treatment, which was completed, but because of their social circumstances had not been discharged

The reasons why these 160 patients were still in sanatoria although not in need of hospital care were as follows no home available (21%), home unsuitable for care of tuberculous (52%), home reasonably satisfactory but with inadequate domestic service (16%), discharge pending or no apparent reason for further stay (11%)

In taking over sanatoria from local authorities hospital boards have evidently accepted two fairly distinct classes of tuberculous patients The possibility of separating them and of providing alternative accommodation for ose patients not in real need of hospital care is discussed

We thank Prof A P Thomson, chairman of the pl committee of the Birmingham Regional Hospital Board, much helpful advice, Mrs M. Hopper for collecting social data, the physicians at the four sanatoria for complet the medical records, and Miss E M Dingley, of Yar Green Hospital, for valuable assistance

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ANOXIA IN THE NEWBORN

INTERNATIONAL SYMPOSIUM IN LONDON

A SYMPOSIUM on Anoxia in the Newborn, organised by the Council for the Coordination of International Congresses of Medical Sciences under the auspices of UNESCO and W H O, was held in London on Oct 1-4. Those taking part in this somewhat unusual meeting numbered seventeen and hailed from six different countries. They formed a working group representing the clinical, physiological, and pathological aspects of the problem The discussions were quite informal and there was no audience

CLINICAL FEATURES

Perinatal Anoxia.—Prof M MAYER (Paris) observed that anoxia began most often in the uterus. He hoped to obtain earlier foreknowledge of threatening anoxia during labour, by carefully recording the fœtal heart and especially by electrocardiographic methods, together with observations on the state of the mother In two-thirds of anoxic infants some artificial method had been used during delivery, especially dangerous in this respect was the combined and repeated use of analgesics and oxytocics

Onset of Respiration—Mr G F GIBBERD (London) urged that the main task of the obstetrician in treating an anoxic infant was to clear its air-passages, oxygenate it, and allow its depressed medulla to recover by keeping it warm and free from further trauma

Nursing the Infant—Dr A ROSSIER (Paris) showed by means of an excellent film the need of the premature infant for absolute freedom to bring all its available muscles into play, to assist its frail thoracic musculature He insisted that small premature infants should be nursed nude, and abdominal distension, with consequent impairment of diaphragmatic movement, should be averted by starvation in the earliest days

ANATOMICO-PATHOLOGICAL ASPECTS

Dr R LAUMONIER (Paris) discussed the part played in anoxia by immaturity of the lung He showed how, in the lung of the small premature infant, uptake of oxygen was hindered by the presence of an alveolar epithelium, and the distance between the alveolus and the pulmonary capillary was expanded by an excess of mesenchymal tissue A considerable amount of glycogen was present in the developing lung, but he could not yet define its metabolic significance

Dr CLEMENT SMITH (Boston) felt that the only positive statements which could be made were that the hyaline membrane appeared more commonly in premature than in full-term infants, and that it was very rarely if ever seen in stillborn fœtuses It did not appear to be associated with infection or pulmonary hæmorrhage. He did not think that we were entitled to reject the inhalation of liquor amnii as an ætiological factor

Dr AGNES MACGREGOR (Edinburgh) concluded also that the membrane did not form before birth, and that it was not composed of vernix caseosa and probably not of amniotic material.

Dr LAUMONIER put forward evidence that the well-recognised hyaline membrane was not composed of vernix caseosa but of a glycoproteinic substance

Dr E K. AHVENAINEN (Helsinki), on the basis of his xperiments in rats, suggested that asphyxial membranes might be due to vomited and inhaled gastric contents

The experts were unanimous that breathing is necessary for the formation of hyaline membrane that this is most ommon in premature infants and that at any rate in evere cases it is a cause of anoxia. They could not agree on its chemical constitution, nor whether anoxia is a constant precursor

PHYSIOLOGY OF ANOXIA

Prof R. BRINKMAN (Groningen) spoke of the tolerance of the foetus to oxygen lack The foetus and the newborn could utilise oxygen completely and were capable of anaerobic metabolism; when the circulation was intact, complete anoxia could persist for about 30 minutes before irreversible changes took place in the central nervous system If advantage was to be taken of this capacity for anaerobic metabolism it was necessary to ensure a supply of suitable materials, especially glucose. Overheating was dangerous because it increased oxygen consumption

Prof. J H P JONXIS (Groningen) showed from a beautiful series of experiments that the oxygen saturation of the full term infant is on the same level as in the adult. In the premature infant, however, there were wide oxymetric oscillations Normal infants reacted rapidly to changes in oxygen concentration in the inspired air, but in infants with cerebral hæmorrhage the reaction was greatly impaired

Dr K W CROSS and Dr T E OPPÉ (London) described their work on the accurate measurement of respiration in the newborn By administering 100 % O_2 and thus removing anoxic impulses from the chemoreceptors of the carotid and aortic bodies they had shown the presence of an active carotid body reflex in the newborn, and further that after a few moments hypoxia this reflex became ineffectual because of medullary depression They also confirmed that periodic respiration was an effective form of breathing in the newborn and was common in perfectly normal infants.

Dr J LIND (Stockholm) suggested from angiocardiographic studies that oxygen tension was a major factor in the change from the foetal to the adult circulation, and that anoxia might cause persistence of the foetal circulation or even reversal of the shunt when functional closure had taken place

Dr JAMES WALKER (Aberdeen), by accurate measurements of the oxygen content of umbilical-cord blood had found that clinical signs of foetal distress occurred only with severe anoxia. He also convincingly demonstrated that in a pregnancy lasting more than 40 weeks there was real functional insufficiency of the placenta, making foetal or neonatal death from asphyxia more likely than in labour at term

THERAPY OF ANOXIA

Dr E MALM (Helsinki) spoke of some of the difficulties besetting the neonate He found an increase in oxygen uptake when 40–60 % oxygen was administered suggesting that the smallest infants were normally in a state of oxygen want. He had not found, however in comparing the mortalities of treated and of untreated infants that oxygen therapy benefited newborn infants.

Dr A. MINKOWSKI (Paris) thought that oxygen was of the greatest value in treating premature infants especially those in whom respiration was irregular and who had cyanotic attacks.

The subsequent discussion showed that none of those present were willing to discard oxygen in the treatment of the premature infant. Reliable evidence of its value was not easily elicited but on the other hand *oxygen toxicity had not yet been clearly shown to be a hazard* The indications and contra indications for its use should be defined as clearly as with any other drug

CONCLUSION

The meeting brought into focus the extremely active growing points of knowledge on this subject, and clarified issues on which work is urgently needed It was obvious that only by the combined efforts of the physiologist and pathologist in the laboratory with the obstetrician and pædiatrician in the wards would a solution be found

Reconstruction

THE SENIOR REGISTRAR

The Immediate Problem and a Solution

By

THE CONSULTANT STAFF OF THE NORTHAMPTON GENERAL HOSPITAL

THE LANCET's leader of Nov 24, ' No Applicants ' whilst stressing the present difficulty in filling junior posts in peripheral hospitals, only touches on another equally serious problem—namely, the position of non teaching hospitals in relation to their registrars. Although the present system of training consultants and in particular the future of senior registrars has been widely discussed we, as members of the staff of a large provincial non teaching hospital, feel strongly that sufficient attention has not been paid to the anomalous position of senior registrars now approaching the end of their term of office in hospitals such as ours.

After the war many hospitals were able to improve their services by the appointment of registrars to their staffs. These men keen and anxious to refresh their knowledge fulfilled an essential service need during the acquisition of training and experience They have proved just as necessary and valuable in non teaching hospitals as in the teaching hospitals where their worth has been known for many years. In many instances they were appointed by a hospital as a registrar with no stated time-limit to their tenure of the post From July 5 1948 many of them accepted a new contract in the grade of senior registrar, and they are now in spite of being granted a fourth year in their posts, approaching the end of their term of office.

It has unfortunately become apparent during the past few years that senior registrars from non teaching hospitals are failing to secure appointments as consultants. *Their failure to secure such posts is partly* due to the fact that the number of consultant posts actually created is not as large as was anticipated and partly to strong competition from senior registrars from teaching hospitals. Their difficulties are at their greatest in the major specialties of general medicine and general surgery but they exist in all departments. Some relief would be provided if more consultant posts could be created. There is a widespread feeling that some boards are delaying the expansion of their consultant staff because of lack of facilities in their hospitals They should be asked to reconsider the position and whenever practicable they should appoint the consultant now and expand the hospital later Much good work can be done even when special ancillary departments are not fully developed

All members of both the medical and administrative staffs of hospitals will agree that an efficient registrar staff is as essential in non teaching hospitals as in teaching hospitals if the value and quality of the hospital service to the public and to the general practitioner is to be maintained The inability of senior registrars *from* non teaching hospitals to secure *promotion* is now widely known *and this is already leading to a decline* both *in* numbers and quality in applications for such posts The requirements of the hospitals make it necessary to take steps to check this decline and common justice demands that the position of the present holders of such posts should be ameliorated We must also remember that some highly able men do *not* mature early They may fail to secure *house-appointments* in a teaching hospital but may later become *sufficiently* skilled to deserve a registrar *appointment*. At present such men find great difficulty *in moving* back to the teaching hospital The same problem arises at other levels and merits a *constructive solution* Both teaching and non-teaching hospitals provide types of work and experience valuable for the training of the future consultant

FOUR SOLUTIONS

Four possible solutions present themselves

A. The appointment of senior registrars from non-teaching hospitals to consultant posts even if they are not the best applicant

B The formation of a grade of resident assistant physician or surgeon with security of tenure

C Restoration of the prospects of entering a general practice combined with hospital work and of progressing later to purely consultant work

D Interchangeability A post as a senior registrar would be held jointly between a teaching and a non-teaching hospital with part of the term of office spent in each type of hospital

Let us consider each of these possibilities in turn

A The mere suggestion that the best applicant might fail to obtain a post is completely false to the ideals of the profession and of the hospital service It would inevitably lead to a rapid deterioration in the quality of the service and cannot be seriously considered

B The formation of a grade of resident assistant physician or surgeon would go far towards solving the immediate problem of the present senior registrar who is reaching the end of his term of office It is unfortunately not a satisfactory long-term solution To be efficient, a registrar needs to be active, inquisitive, and enthusiastic as well as able and energetic He progresses by receiving tuition, by teaching others, by practice, and by study If we create posts of long tenure for those who fail to secure consultant appointments, we shall replace our present registrars by a group of inferior persons who carry out routine duties without zest or interest and whose lack of hope of advancement leads to mental stagnation and deterioration

As a temporary expedient it would be permissible to extend the tenure of those holding senior registrar posts now, to give them more time in which to secure permanent appointments All those whose term of office expires within the next eighteen months should be interviewed and their records considered by a special committee, if possible at national level This committee should have adequate representation of the non-teaching hospitals as well as of the teaching hospitals and Royal Colleges A number of senior registrars only slightly greater than the expected number of consultant vacancies in the next two years should be selected for extension of their contract We think that the interview is a most important advance on the present policy, and that it will make the work of this committee not dissimilar from that of an advisory appointment committee

For the chosen few, an extension of contract beyond four years should be granted The other senior registrars must be told that there is very little hope of their attaining consultant status, and that their posts will be terminated at the end of their fourth year, or in a year's time, whichever is the later

C The general-practitioner consultant is disappearing and it will shortly be impossible for any man to undertake part-time work in both spheres or to give up general practice as his consulting work increases It has never been easy for any man engaged in general practice to maintain his knowledge of new advances at consultant level Payment for hospital work means that no young consultant needs a general practice in order to gain a living The ties of general practice undoubtedly can interfere with hospital work and it is therefore desirable that the hospital consultant staff shall be wholly engaged in specialist work

This suggestion is therefore no solution of the immediate [illegible] To some extent it does suggest the solution [illegible]g-term problem of registrars who fail to become senior registrars, and of those few senior registrars in future may fail to secure consultant posts

Registrars who enter general practice can hospital work as clinical assistants Improved means entering practice must be found for them An step is an increase in the capitation fee, and a reduction in the maximum number of patients allowed on each doctor's list, so that every general practitioner will find it easier to take a partner Hospitals must ready to make use of ex-registrars Whilst it can be compulsory for any hospital to provide a post clinical assistant for an ex-registrar, there should be an understanding that every effort will be made to offer such work To the ex-registrar his continued hospital association should be interesting and valuable, and should enhance his status among his colleagues in practice and among his patients A closer liaison between executive councils and regional boards is needed to resolve the present difficulties in entering general practice

D What is meant by interchangeability? A joint committee formed in equal numbers by a regional hospital board and its appropriate board of governors, with university representatives, should consider which hospitals and which departments in their region provide experience and teaching and a volume of work adequate for the training of a senior registrar The number of posts in this grade will need to be equalised throughout the country and preferably in each region between the regional board's hospitals and the board of governors hospitals The appointment would be a joint one between the two boards and the successful applicant would spend two years in the teaching hospital and two year in a non-teaching hospital There must be no risk o a future consultant being posted by a regional board t a small hospital or department where he might no obtain adequate teaching and practice Many hospital have residential accommodation for their registrar Where the registrar needs a flat or house because o family ties, this may often mean an interchange betwee the incoming and the outgoing man In some instanc it might compel the hospital to obtain flats, or house for conversion into flats, for their senior registrar This is already the common practice on the Continen and we should be prepared to copy There will be othe administrative problems, but they can be solved wit genuine good will

The four years of senior registrarship will be mos valuable if the initial year is occupied in work in teaching hospital The next two years should be spent i a non-teaching hospital where the man will obtai extensive practical experience and where he will fin considerable responsibility delegated to him The majo non teaching hospitals have good libraries and he wil be able to prepare the basic notes for original paper to be written during his fourth year During these year he will have an opportunity of developing a specia interest in some branch of his specialty On his retur to his teaching hospital for his fourth year he will b able to put an academic polish on his work, and h should find time to develop his study of his specia interest, and to write

CONCLUSION

We believe that the solution of the immediate problem lies (1) in the creation of as many new consultant post as possible, and (2) in a personal interview of senio registrars by a review committee Those selected a likely to secure a consultant post in due course shoul have an extension of their contract Those who fai to pass this test will be told a definite date for the termination of their office This date must be fixed wel in advance so that they may have adequate opportunities of entering other fields of work Entry into general practice must be simplified

As a long term policy, very careful selection must be made before a person becomes a senior registrar Equation of the number of such posts to the anticipated number of consultant vacancies will give them all a fair chance of securing promotion The posts must be held partly in teaching and partly in non teaching hospitals. Extension of tenure beyond four years should be permitted only in a temporary supernumerary capacity During the fourth year and during this supernumerary extension senior registrars should be encouraged to travel in this country and abroad to widen their knowledge and experience and to study special problems. -

Boards and registrars alike must realise that permanent appointments should normally be obtained during the fourth year of office. The belief that a consultant is not trained until he has completed four years' service, coupled with the termination of his appointment at the end of four years, is a small but potent cause of the present difficulties At the end of his four years as senior registrar a man will have secured a sound academic and practical training and will be ready to serve in either type of hospital

Interchangeability will provide good staff in both varieties of hospital and will give all men experience of their future work It will help to spread the influence of the teaching hospital into the periphery of the service and will build friendly relations between the teaching and non teaching hospitals

Medicine and the Law

The Case of Kuong B Li

THE *Yorkshire Post* in a recent issue reports an incident of interest to hospital managements.

In March 1948 a Chinese applicant, Mr Kuong B Li, was appointed to the medical staff of the General Infirmary at Leeds His application, written from the United States, was accompanied by convincing testimonials It stated that he was a doctor of medicine and also (though this was less material) a doctor of philosophy He remained at the infirmary for two years, giving complete satisfaction by his uniform courtesy and although apparently he never performed any major operation his professional competence He claimed it was said to have obtained 90% of marks at his final examination His colleagues had reason to believe that he had been trained under American surgeons During his stay in Leeds he wrote a letter to the press (on the subject of football in which he showed great interest) which was signed K B Li, PH D M D"

Subsequently a chance conversation between a professor from Leeds and a professor from Canada meeting at a conference, led to doubts Kuong Li's name happening to be mentioned the Canadian professor recalled him as a medical student whom he had himself taught he spoke of him as having been conspicuously unsuccessful and as having left the Canadian university without any qualification whatever Inquiries were initiated Kuong Li was suspended , a few days later he resigned, protesting that he was the victim of a mistake to which the destruction of records at Hong Kong University during the Japanese occupation had contributed The evidence says the *Yorkshire Post* has been submitted to the director of public prosecutions but no proceedings are likely Kuong Li was believed to have gone either to Shanghai or Canada Even if he returned to England the expense of bringing witnesses from Hong Kong or Canada would hardly be justified

Laymen may comment derisively upon the episode as showing that medical degrees are unnecessary and even that professional examinations are illusory Once more it is worth while to emphasise that the Medical Act, in penalising persons who assert qualifications which they do not possess, was passed to protect the public and not the medical profession It is a pity that the handsome new 3rd edition of *Statutes Revised* omits the all important preamble to the Medical Act That brief statement of the objects of the statute would remind the critics that it was not enacted to confirm a practitioners' monopoly but because it was expedient that the public should be able to distinguish the qualified from the unqualified.

Public Health

The Rise in Cancer of the Lung

Prof. A Bradford Hill's study of tobacco and cancer of the lung and bronchi is shaking the peace of many a moderate smoker Whatever the cause, the rise in importance of this disease is very striking The annual reports of the medical officers of health of the Metropolitan boroughs show that in 1950, in at least 17 out of the 29 boroughs, deaths from neoplasm of the lung and bronchus were more numerous than deaths from tuberculosis (table I) This is something quite new In 4 of the reports deaths from malignant disease are not analysed according to their sites, but are given in total only so it is not possible to say what the position may be in these boroughs (Bermondsey, Fulham, Kensington, and Wandsworth) In the rest deaths from tuberculosis still exceed deaths from neoplasm of the lung and bronchus but in 6 of these the deaths from pulmonary or bronchial neoplasm run those from tuberculosis very close. Indeed in 2 of them (Battersea and Paddington) the deaths among men and in 2 others (Hammersmith and Westminster) the deaths among women, from neoplasm exceeded those from tuberculosis.

This approximation of the figures for the two diseases is undoubtedly due in part to the fall in the number of deaths from tuberculosis. From some of the reports, which give a table showing deaths or death rates from tuberculosis over a period of years, it has been possible to extract the figures shown in table II. These indicate that, in some boroughs at all events, deaths from tuberculosis (all forms) have been falling somewhat

TABLE I—DEATHS (TOTALS) IN THE LONDON BOROUGHS FROM TUBERCULOSIS AND FROM NEOPLASM OF THE LUNG OR BRONCHUS, IN 1950

Borough	Pulmonary tuberculosis		Neoplasm of lung or bronchus		Both sexes	
	M	F	M	F	Tuberculosis	Neoplasm
Battersea	30	14	32	4	44	36
Bermondsey	N.A.	N.A.	N.A.	N.A.	43	N.A.
Bethnal Green	12	6	25	6	18	31
Camberwell	47	10	62	11	57	73
Chelsea	N.A.	N.A.	N.A.	N.A.	14	22
City of London	N.A.	N.A.	N.A.	N.A.	3	1
Deptford	19	7	31	6	26	37
Finsbury	N.A.	N.A.	N.A.	N.A.	17	21
Fulham	N.A.	N.A.	N.A.	N.A.	34	N.A.
Greenwich	26	15	21	5	41	26
Hackney	38	17	60	8	55	68
Hammersmith	28	10	24	12	38	36
Hampstead	N.A.	N.A.	N.A.	N.A.	24	25
Holborn	7	3	10	2	10	12
Islington	58	31	115	14	89	129
Kensington	N.A.	N.A.	N.A.	N.A.	52	N.A.
Lambeth	58	30	87	11	88	98
Lewisham	35	31	65	9	66	74
Paddington	35	18	36	12	53	48
Poplar	15	16	30	6	31	36
St Marylebone	18	2	36	9	20	46
St. Pancras	55	14	74	7	69	81
Shoreditch	10	7	17	2	17	19
Southwark	N.A.	N.A.	N.A.	N.A.	51	47
Stepney	N.A.	N.A.	N.A.	N.A.	50	47
Stoke Newington	7	8	N.A.	N.A.	15	16
Wandsworth	87	49	N.A.	N.A.	136	N.A.
Westminster	30	7	27	8	37	35
Woolwich	N.A.	N.A.	N.A.	N.A.	53	71

N.A. = Not analysed in the report.

TABLE II—THE FALL IN DEATHS, AND IN DEATH RATES, FROM TUBERCULOSIS OVER FIVE YEARS

Year	Deaths from tuberculosis (totals, all forms)						Death rates from tuberculosis (all forms) per 1000 population			
	St. Pancras	Holborn	Hammersmith	Hackney	Camberwell	Paddington	Battersea	Lewisham	Shoreditch	Paddington
1946	98	13	85	Av 104	99	100	0 84	0 53	1 01	0 85
1947	105	18	90		135	83	0 60	0 55	0 74	0 65
1948	98	13	76		117	81	0 66	0 48	0 84	0·68
1949	105	15	51	92	94	85	0 46	0 40	0 84	0 65
1950	76	11	39	63	64	55	0 38	0 29	0 45	0·42

irregularly for the past five years, but that between the years 1949 and 1950 they dropped suddenly, in all the cases analysed, by about a third Whether deaths from neoplasm of the lung and bronchus have been rising over the same five-year period is not shown in these reports, and medical officers of health might consider including figures illustrating the point in their reports for 1951 Meanwhile the shift in importance of the two diseases, as causes of death, demands attention

Salmonella Minnesota Infection in Northamptonshire

We are indebted to Dr D A McCracken, medical officer of health for Towcester, for the following notes

An outbreak of food-poisoning in a village in south-west Northamptonshire came to notice on Friday, Dec 21, and next morning suspicious cases were reported from five neighbouring villages Investigation suggested that the infection had followed consumption of meat pies Samples of the suspected pies and of fæces from patients were examined at the Public Health Laboratory, Northampton, on Dec 24 the cultures were identified as *Salmonella minnesota*, and this finding was confirmed by the Salmonella Reference Laboratory, Colindale

Cases have been reported from thirty-seven villages in south-west Northamptonshire and north Buckinghamshire, as well as from adjoining towns, the affected area coincides with the area supplied by the factory which made the suspected pies By Jan. 5, over 450 cases had been notified The notified cases represent people who have sought medical advice, and it is known that the total number infected is even greater

A large proportion of the cases notified have been in people over forty-five years of age The incubation period has apparently averaged about eighteen hours, but in some instances it has been as long as ninety-six hours Attacks have been ushered in by headache, mild pyrexia, nausea and vomiting, and diarrhœa, herpes has been noted in a number of cases, particularly in patients who were acutely ill Usually the symptoms have been mild, lasting on average three days, but the patients have felt miserable and depressed for a further three or four days Young adults have recovered quickly, but the elderly have suffered severely, and some have been confined to bed for over a week Altogether 8 patients have been admitted to hospital, and 2 elderly patients have died

No pies were produced at the factory for ten days, during which time intensive disinfection with a hypochlorite solution was carried out Swabs taken from the benches after disinfection were reported as showing no pathogenic organisms A few employees were found to be excreting *Salmonella minnesota*, and these were excluded from the premises Bacteriological examination has eliminated shell eggs, egg substitute, fat powdered gelatin, and sausage rusk as possible sources of infection A rat caught on the premises gave no evidence of salmonella infection At present it seems that the original source of infection may have been imported chopped pork. Examination of samples the meat is continuing

Dr McCracken concludes "My impressions of t outbreak are that the infection has been taking p for some weeks People had mild attacks of and paid little regard to the condition The and convenience of pies for a cold meal during t festive season resulted in an increased sale and therefor a larger number at risk—the result being the present outbreak."

Compulsory B C G Vaccination In France

A law comes into force in France on April 1, whereby any child living in a house with a tuberculous person who is receiving help from public funds must be vaccinated with B C G The law was passed in January, 1950, and the reason given for the delay is the necessity of making a census of these children and arranging vaccination centres for them Vaccination with B C G is already compulsory for the children entrusted by their parents to the *Œuvre Grancher*, and in several départements, such as Isère and Basses-Pyrénées, there are crèches for the B C G vaccination of other infants[1]

Venereal Diseases in the Rhine Ports

The incidence of venereal diseases throughout westem Europe has in general declined since the late war, but th particular figures for sea and river ports are not s satisfactory It is estimated that 44% of new cases o syphilis in Norway in 1946 were introduced throug its ports by merchant seamen and the relative importanc of this source of infection has remained much the same W.H O is directing a special campaign against infectio in the maritime areas, and an encouraging start has bee made in the Rhine ports

The international anti-venereal-disease commissio of the Rhine is the technical body which coördinate prevention and cure in the Rhineland countries Fr medical advice and treatment is available to a nationalities, and the necessary social help is given t patients and their families whenever possible Nearl all the river towns report a significant drop in the rat of infection since the work began It is expected tha similar commissions will be set up under the auspice of W H O in other areas where venereal disease i particularly prevalent

As a part of the campaign, a new centre with moder facilities for diagnosis and treatment, and for the trainin of doctors, nurses, and others, was opened in Rotterdam on Dec 21 'Rotterdam was chosen because it is th terminus of most traffic coming down the river from a far inland as Basle, as well as having a very large turn over of ocean shipping It is also the headquarter of the commission W.H O has provided the necessar personnel, as well as some supplies and materials, an the Netherlands government have made a special clin available It is hoped that this centre will prove model from which others will be planned

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[1] Armand Delille, P F *Bull Acad Méd Paris*, 1951, 135, 56

Infectious Diseases in England and Wales

Disease	Week ended Dec				
	1	8	15	22	29*
Diphtheria	45	30	42	54	4
Dysentery	327	537	337	422	29
Encephalitis					
Infective	6	4	6	1	
Postinfectious	2	2	1		
Food poisoning	95	93	55	182	44
Measles excluding rubella	2313	2344	2448	2324	233
Meningococcal infection	30	29	29	30	2
Ophthalmia neonatorum	41	30	37	27	2
Paratyphoid fever	18	14	17	17	
Pneumonia primary or influenzal	432	462	583	683	67
Poliomyelitis					
Paralytic	30	37	36	22	1
Non paralytic	17	16	8	6	
Puerperal pyrexia and fever	218	219	226	203	13
Scarlet fever	1588	1561	1543	1555	109
Smallpox					
Typhoid fever	2	3	1	6	
Whooping-cough	1852	1930	1929	1826	140

* Not including late returns

Integration of the Health Services

In his report for the year 1950, Dr Reginald Leader medical officer of health for Ipswich, calls for closer integration of the National Health Service

"It may not be appreciated that the Act is administered throughout England and Wales locally by some 714 authorities in all. These comprise 36 Boards of Governors, 14 Regional Hospital Boards, 374 Hospital Management Committees, 146 Local Executive Councils and 145 Local Health Authorities. Other health functions in connection with control of infectious disease and environmental matters are also carried out by 1439 local sanitary authorities, including the 83 County Boroughs already included amongst Local Health Authorities above. The School Health Service is conducted by 146 Local Education Authorities, the same as the Local Health Authorities above and some 147 excepted districts for education, under the Education Act 1944 These bodies have all their separate functions and no clearly defined methods of co-operation if they exist, are very evident

Dr Leader concludes: 'It is pertinent to ask, therefore how far can the Act really become an effective instrument for the prevention and treatment of illness until one body is responsible for all health purposes in each area?'

The Great Towns in 1951

The following figures for the Great Towns of England and Wales have been announced by the Registrar-General[1] They show totals up to Dec 29, 1951, together with the corresponding figures for 1950, and may give some guide to national trends during the past year

	Total	
	1951	*1950*
Live births	361,359	371,188
Stillbirths	9397	9459
Deaths	279,678	260,028
Deaths under 1 year	12,229	12,578
Scarlet fever (cases)	25 774	33,892
Whooping-cough (cases)	76,084	84 192
Diphtheria (cases)	1239	1971
Tuberculosis (deaths)	7142	8934
Measles (cases)	[illegible]01 710	184,275
Poliomyelitis (cases)	1478	4162

London's Health in 1951

A preliminary account of the vital statistics for London in 1951 has been issued by Sir Allen Daley, county medical officer of health.

The provisional birth rate was 15·8 per 1000 compared with 15·7 in 1950 16·7 in 1949 17·9 in 1948, and 20·0 in 1947 It is still too soon to suggest any level at which post-war fertility may stabilise, but the 1951 rate is not significantly different from that for 1950 and for the present the decline has ceased

The provisional death rate was 12 7 per 1000, compared with 11 3 in the previous year The higher mortality in 1951 says the report, may be attributed in part to the influenza epidemic in the early months of the year

The provisional infant-mortality rate was 26 per 1000 live births—the same as in 1950 The provisional rate for neonatal mortality was 17·4 per 1000 live births, compared with 16·0 in 1950 The maternal mortality rate (excluding abortion) which in 1950 was 0·53 per 1000 live and still births, in 1951 was 0·52

INFECTIOUS DISEASES

The preliminary report includes the following observations on epidemic diseases

Measles—Heavy incidence low mortality (24 deaths)

Whooping-cough.—Average incidence low mortality (25 deaths)

Scarlet fever—Low incidence; low mortality (2 deaths from scarlet fever and streptococcal sore throat)

Diphtheria.—Very low incidence; only 1 death

Typhoid fever—Average incidence; no deaths.

Infantile diarrhœa—Incidence below average; mortality much below average (44 deaths)

Poliomyelitis—Low incidence; low mortality (3 deaths)

Notifications of new cases of tuberculosis again fell—from 5718 to 5170 The provisional death rate was 0·38 per 1000 (a new low record), compared with 0·40 in 1950

In England Now

A Running Commentary by Peripatetic Correspondents

I WOULD like to record the impact of moustache growth on a family in particular and a country practice in general

As a protest against my in laws staying for more than a few days I refrained from shaving my upper lip For a day or so there was no comment, but at last my wife asked incredulously whether I was growing a moustache Disguising my excitement, I replied casually in the affirmative. The effect on my parents-in law was startling, but for once there was nothing they could do about it so after a few days they left Flushed with success I kept it even though it had a tinge of red *Once it had established itself the reactions to it outside* the family were varied One mother, telling me about her daughter's ailments, addressed me as if I was a new assistant and told me that 'Dr T" (myself) knew all the past history and I could ask him' (myself) A troublesome woman who had sent for me ended her long list of complaints with: ' and if you don't mind my saying so, doctor I don t like your moustache This was the first complaint of hers that I could certainly cure but the ordering of razor-blades on form E.C 10 has been disallowed so I refused to oblige.

During this period I visited my teaching hospital and left my bag for an hour or two with the porter at the lodge. He pertly inquired whether I would like to leave my toothbrush with my other things.

At last I developed a streaming cold which my wife described as hay fever from my mouldy growth. This was bad enough, but to tell the truth I had found it an insufferable inconvenience, so I crept away to the barbers and had it off The saddest blow was that for two days nobody noticed its departure

• • •

The remarkable photographs of the tracks of the *yeti*, or "Abominable Snowman found high in the Himalayas and reported by Mr Eric Shipton (*Times* Dec 6 and 7, 1951) must have stirred more pedestrian imaginations than that of my fellow peripatetic (Dec. 22) The Sherpa porter, who had seen one of these creatures about 25 yards away, described it as 'half man and half beast, covered with reddish brown hair but with a hairless face' Mr Shipton has seen similar tracks on previous expeditions. A campaign has already started in South Kensington to prove that the tracks are those of a mere monkey, but the possibility that the *yeti* is what Mr Harry Price would call a "paranormal phenomenon" is strongly supported by traditions and reports from other mountainous places. The Caucasus and Atlas mountains, and even our Scottish Highlands are believed to be the homes of malevolent spirits, who usually appear as a giant spectre in snow or mist, so terrifying the traveller that he flies headlong, only by a great effort of will not throwing himself over a precipice The Mountain, they say sometimes resents intruders.

In the *Cairngorm Club Journal* (1951 11 214) a distinguished scientist and climber describes his encounter with Ferla Mòhr, the Grey Man, on the summit of Ben Macdhui In no circumstances he writes, would he return to the place alone Other witnesses have described various manifestations on this mountain—the giant figure of a shepherd about ten feet high, in traditional Highland dress giant footsteps in the snow, one to about seven of one's own slowly but relentlessly catching up and always the intense terror for which there is no relief except in flight.

It was therefore with some trepidation that I set out with a companion to explore Ben Macdhui, especially as the conditions happened to be ideal for the Grey Man, with a cold searching wind and dense swirling mist on the tops We concentrated on map and compass, studiously avoiding any reference to spectres, and secretly comforted ourselves by recalling that these figures mostly appear to the solitary traveller As readers may have anticipated we witnessed no paranormal phenomena whatever, one can only hope that an emancipated citizen of this Age of Reason, with

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[1] Registrar-General's Return for the Week ended Dec 29 1951; H M Stationery Office Pp 20 9d

Dr. Robert Heilig Library
S. M. S. Medical College

scientific training, would face such an ordeal with equanimity, not forgetting to record some useful observations

On descending out of the mist our comment, in the words of Queen Victoria, was "*Never* shall I forget this day, or the impression this very grand scene made on me, truly sublime and impressive, such solitude" Later we appreciated for the first time (being English) that the national drink of Scotland does *not* taste the same South of the Border

* * *

From reading about injuries sustained at work you would imagine that occupational hazards to life and limb did not exist until the Industrial Revolution These injuries no doubt increased in number and extent with the arrival of power-driven machines, but windmills and water-wheels were a danger to workpeople long before the advent of steam There must have been some risky jobs in the flour mills two hundred years ago, though according to old records the accidents were few and those that did occur aroused much comment The hand tools of those days, many of them devised centuries earlier, could be lethal in clumsy hands, and, in some trades at least, the manual dexterity of the average artisan must surely have been greater than today

Take the adze, for instance This tool, seen nowadays only in small shipyards and at sea, was then in general use for shaping and smoothing timber—you see its marks on old oak furniture, or the blackened beams of an Elizabethan farmhouse Inexpertly used, an adze can lame a man permanently with one blow, though I have seen a ship's carpenter sharpen a pencil with his adze, steadying the pencil with his foot and wielding the tool just as he did when shaping a baulk of timber

Scythes are always supposed to be dangerous, but the simplest precautions will prevent trouble During intervals for refreshment a scythe can easily be hooked into the fork of a tree or lent against the hedge, and in winter it will be hung well out of the way on the barn wall, some people take their scythe to pieces and lay out the handle between weights on a ledge, to preserve its special curves

Then there's the hay-knife, one of the most vicious tools ever devised—heavy, of awkward shape, with a razor edge and a sharp point I have some personal views on hay-knives at the moment because our man Arthur is ill and it devolves on me, to fill the hungry mouths that open regularly twice a day This means spending all my spare time cutting hay out, but so far my toes are all present and correct If I do disgrace myself by lopping off one or two, the loss will be made more bearable by memories of the smell of rick hay—in my view unquestionably better than hay mechanically baled in the field at haysel—and the sudden thrill, one dismal winter's day, when a patch of dry vetch bloom recalls a corner of the eight-acre on that glorious June evening which six months later you can hardly believe ever existed Among the spate of advertising brochures that came by the Christmas post was one describing some drink or other as bottled sunshine, how much better reminder of sunshine was that yellow layer in the hay on Boxing Day Incidentally, though, there was much to be said for a bottle after manipulating that hay-knife for a few hours

* * *

Demonstrating cases to visiting physicians is all in the day's work at our clinic, and a colleague was recently showing round a professor from Athens, a charming man who spoke excellent English They came to a patient suffering from a combination of dysphasia and Irish brogue, and my friend couldn't make head or tail of her replies, so he told the professor apologetically, "I'm afraid this is all Greek to me!" Realising his gaffe too late to withdraw, he asked what the Greeks would say in a similar situation "Oh" said the professor, smiling, "we would say 'It's all Chinese'"

It seems that Greek is synonymous with gibberish in most western European tongues though Germans more often say, "It's all Spanish" So far we have not got hold of a Chinese to tell us what they say behind the Bamboo Curtain

Letters to the Editor

BLOOD-GROUPS AND REPRODUCTION

SIR,—Evidence has just been presented of a relatio ship between the ABO blood-groups and the huma sex-ratio at birth, Sanghvi[1] having found a significan difference between the sex-ratio of, on the one hand, infants born to A mothers and, on the other, O infant born to O mothers and B infants born to B mother Examination of his data, however, appears to provid more general information, together with a remarkal degree of correlation with certain fertility data Waterhouse and Hogben[2]

TABLE I—CORRELATION OF FERTILITY DATA OF WATERHOU AND HOGBEN WITH SEX-RATIO DATA OF SANGHVI, IN RESPE OF THE 7 MOST COMMON ABO BLOOD GROUP MATINGS

Data of Waterhouse and Hogben				Data of Sanghvi			
No of families in sample	No of children in sample	Types of mating	Average no of children per family	Ratio of male to female children	Infants ex mothers	No of male infants born	No fem infar bor
17	62	B×B	3 53	1·44	B ex B	153	106
66	229	B×O	3·47	1 40	O ex O	311	222
225	779	O×O	3 46	1 18	B ex O	66	56
54	171	O×B	3 17	1 14	O ex B	74	65
244	835	O×A	3 42	0 99	A ex O	105	10
209	686	A×O	3 28	0 95	O ex A	91	9
189	599	A×A	3 17	0 93	A ex A	195	21

For example, calculation from Sanghvi's figures giv the ratio of all male to all female infants at birth as 1 to 1 (or 4 to 3) for infants of group B, as 1 25 to 1 (or to 4) for infants of group O, and as 0 98 to 1 (or virtu unity) for infants of group A It also gives the ratio of male to all female infants produced by group B mothe as 1 30 to 1, by group O mothers as 1 26 to 1, and group A mothers as 0 96 to 1 And that a similar resu may not unreasonably be expected in the case of t offspring of fathers of groups B, O, and A is strong suggested by (amongst other things) the individu ratios expressed in table I In this and the followi table the group of the father or infant precedes t mother's group, and the principle of comparison of t two sets of data is evident

TABLE II—CORRELATION OF FERTILITY DATA OF WATERHOU AND HOGBEN WITH SEX-RATIO DATA OF SANGHVI, RESPECT OF THE 5 RAREST ABO BLOOD GROUP MATIN

Data of Waterhouse and Hogben				Data of Sanghvi			
No of families in sample	No of children in sample	Types of mating	Average no of children per family	Ratio of male to female children	Infants ex mothers	No of male infants born	No fem infa bor
20	80	AB×A	4 00	1 45	B ex AB	32	22
8	30	B×AB	3 75	1·40	AB ex A	28	20
28	96	A×AB	3 39	1 38	AB ex AB	18	1
9	24	AB×AB	2 67	1 32	A ex AB	25	1
6	14	AB×B	2 33	1 16	AB ex B	20	25

Despite the much smaller numbers involved, the fi rarest forms of ABO mating, as displayed in table give quite an appreciable correlation with the right ha of the table (in which the arrangement of the groups a curious symmetry)

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[1] Sanghvi, L D *Nature Lond* 1951, 168, 1077
[2] Waterhouse, J A H, Hogben L *Brit J soc Med* 1947, 1,

n view of the foregoing observations it is pertinent to o that the ABO matings having less than average ility according to the Waterhouse Hogben data—nely, A×O, A×A O×B, A×B, and certain rarer sses—have, in this laboratory been found to be ecisely the matings predominant in sterility and ortion, by far the largest abnormality of blood-group stribution being a significant excess of group B wives both the samples. Furthermore, these particular atings have been found to yield a substantial correla ion, in abortion, with the Rh mating of Rh negative usband × Rh positive wife whilst in sterility (on a maller scale) they seem to have a relation to the Rh nating of Rh positive husband × Rh negative wife

On the other hand it has been noted that the ABO matings of *more* than average fertility according to the Waterhouse-Hogben figures—these being mainly the reciprocals of the less fertile, and deficient in abortion and sterility—possess a high degree of correlation, in abortion, with the Rh mating of Rh positive husband × Rh negative wife, and in sterility (again on a smaller ale) with the Rh mating of Rh negative husband × Rh ositive wife

The general conclusion is that such part as the blood roups may play in reproduction is to a greater extent enetic than serological

A detailed account of these findings will appear in the *British Journal of Social Medicine.*

T M ALLAN

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FOUR CASES OF POLIOMYELITIS IN THE SAME FAMILY

SIR,—Dr Kennedy's excellent report (Dec 22) minded me that in September 1924, I saw four siblings l of whom had contracted poliomyelitis during the revious month

Their ages ranged from 8 years to 6 months three f the children exhibited a paralytic form of poliomyelitis, nd in one—the first to be affected—the disease was purely of meningitic type The family was Norwegian, nd all four children developed the disease while staying together near Hunstanton Norfolk.

CASE 1 —The first affected was the second son aged 6 years. The onset occurred on Aug 12 with sore throat, headache vomiting pyrexia, and stiffness of the neck. He made a good recovery without paralytic symptoms, after 4 days pyrexia.

CASE 2 —The second was the third child of the family a boy aged 5 years. The onset occurred on Aug 15 3 days after the first case again with sore throat vomiting pyrexia, and stiffness of the neck. The pyrexia subsided after a few days when it was noticed that his left leg was weak; and later he walked with a limp When examined on Sept 15 a month later he showed reduced power in the left quadriceps and hamstrings with an absent knee jerk but only ½ in wasting as compared with the circumference of the right thigh

CASE 3 —The third case—the eldest boy aged 8 years—developed the disease on Aug 19 1 week after the first case and 4 days after the second On the 1st day he complained of headache and vomited repeatedly with rise of temperature to 104 F On the following day stiffness of the neck was present Pyrexia persisted for 4 days, and for 10 days it was stated that he could scarcely move and seemed paralysed all over Thereafter his condition gradually improved but his left arm remained paralysed. On Sept 15 there was left-sided paralysis of the triceps and weakness and atony of all the following muscles: trapezius, rhomboids, serratus magnus, latissimus dorsi pectoralis major deltoid, biceps, and brachio radialis. When he was seen 6 months later there remained only weakness and atrophy of the triceps, biceps, deltoid and trapezius

CASE 4 —The youngest child a girl aged 6 months, was not attacked until Aug 2[illegible]—14 days after the onset in case 1 developed vomiting and pyrexia but no stiffness of the neck. The temperature subsided after a few days, but 2 weeks later it was noticed that she did not move her legs On examination on Sept. 15 there was flaccid paresis of both legs with complete paralysis of the quadriceps extensor of each side and only weak voluntary movement in all the remaining muscles, with the exception of the flexors and extensors of the toes. The knee jerks and ankle-jerks were both absent. 6 months later the right leg only had improved slightly

C WORSTER DROUGHT

London W 1

TEST OF HYPOCORTICOIDISM

SIR,—In 182 cases we have determined the blood-sugar level, first with the patient fasting and then 3 hours and 5½ hours after ingestion of the boiled white of five eggs Throughout the tests the patients were resting We accepted only changes of more than ±10 mg per 100 ml. as evidence of increase or decrease of the blood-sugar value.

TABLE I—EFFECT ON BLOOD SUGAR LEVELS OF PROTEIN MEAL

Diagnosis	No of cases	Blood-sugar change		
		Increase (10–30 mg per 100 ml.)	No change	Decrease (10–40 mg per 100 ml)
No abnormality	88	44 (50%)	39 (44%)	5 (6%)
Endocrine controls	36	16	17	3
Hypocorticoidism	13	Nil	1	12
Anterior pituitary insufficiency	45	2 (4%)	18 (40%)	25 (56%)

Table I shows that in 83 out of 88 normal people the blood-sugar level increased or remained unchanged Similar results were obtained in patients with various endocrine disorders, excluding diseases of the pituitary, thyroid, and adrenal glands.

In each of 13 cases of hypocorticoidism, however, the blood-sugar had decreased after ingestion of egg-white—though in 1 case by only 9 mg per 100 ml The average change 3 hours and 5½ hours after the meal was −13 mg and −10 mg per 100 ml Similarly, in 43 out of 45 cases of anterior pituitary insufficiency (Simmonds's disease, cryptorchism, chromophobe adenoma, primary amenorrhoea Fröhlich's syndrome pituitary nanosomia pituitary obesity with hypogonadism Laurence Moon Biedl syndrome &c.) we found that the blood sugar decreased (25) or remained unchanged (18); and in the latter group the clinical evidence of hypocorticoidism was not prominent

TABLE II—BLOOD-SUGAR LEVEL IN RATS 30–60 MIN AFTER PROTEIN MEAL

Description	No of animals	Blood-sugar				
		Increased	Unchanged	Decreased	Av change (mg per 100 ml)	Biphasic curve
Normal	18	16	1	1	+20·7 (±10·0)	Nil
Adrenalectomised	37	5	3	24	−13·0 (±13·3)	5
Transplanted adrenals	9	5	Nil	2	+12·8	2
Cortisone	8	5	Nil	1	+13·1	2
Deoxycortone	6	Nil	2	3	−0·0	1

The increase in the blood sugar that normally follows ingestion of protein is supposed to be due to gluconeogenesis or to glycolysis in the liver In our opinion the decrease in the blood sugar level after a protein meal a patients with hypocorticoidism is due to lack of gluconeogenesis from insufficient secretion of glucocorticoids by the adrenal cortex This interpretation is supported by our experimental evidence

In rats the fasting blood sugar level was determined, and further determinations were made 30, 60, and 90 minutes after the administration by stomach tube of 0·5 g of boiled egg white In normal animals the blood sugar increased, whereas in adrenalectomised animals the level fell (table II)

In adrenalectomised animals transplantation of two rat adrenal glands or the administration of 1 mg cortisone was followed by the restoration to normal of the blood sugar curve *Deoxycortone, however, did not produce this effect*

In patients with signs of adrenal insufficiency the blood-sugar curve was normal after administration of cortisone but not after deoxycortone, and in patients with anterior pituitary insufficiency the curve was also normal after transplantation of a calf's pituitary gland or stimulation of their own pituitary by ketogenic diet[1] or ammonium chloride[2]

Thus an increased or unchanged blood sugar level after administration of protein indicates normal adrenocortical function Decrease of the level after 3 hours and/or $5^1/_2$ hours is an almost certain indication of adrenal insufficiency, and this abnormal response may be restored to normal by administration of cortisone

József Attila Hospital,
Budapest, Hungary

A GÓTH
E BENCZE
L LENGYEL

LITTLE-KNOWN COSTAL SYNDROMES

SIR,—Dr. Deane's article[3] on costal chondritis (Tietze's disease) and Dr Harwood Stevenson's article[4] on nerve nipping at the intercostal margin have done valuable service in drawing attention to conditions which do not seem to be well known Their information should prove particularly useful to those working in *surgical outpatient departments*

Costal chondritis is probably more common than is generally realised I had seen several patients with the condition prior *to reading Dr Deane's paper—and one* since The 2nd costal cartilage was involved in each case, the patients had been sent up to hospital with pain and swelling, and a diagnosis "? tumour (sarcoma) ? tuberculosis" They gave rise to considerable anxiety till the gradual diminution of the swelling and symptoms suggested a benign condition, though they left one at a loss for an exact diagnosis

Dr Stevenson's case-histories show how the nipping of an intercostal nerve by two loose costal cartilages at the costal margin can also give rise to confusion in diagnosis and suggest serious organic disease I have lately seen a similar case

A woman, aged 44, who had been treated some years before for pulmonary tuberculosis, which was now stated to be quiescent, *complained of severe pain under the right costal* margin whenever she coughed The pain was accompanied by the appearance of a swelling, which had been diagnosed as an unusual variety of epigastric hernia

The tip of the 9th right costal cartilage was found to be loose, it could be made to slide up over the costal margin with the production of the pain and swelling The symptoms were completely relieved by resection of the loose end, about 1 in of cartilage being removed

The dislocation of the interchondral joint in this case with the production of a "slipping rib" probably originated in a fit of coughing—an ætiology similar to that of the cough fracture of ribs recently described by Mitchell[5] and Wynn Williams[6]

Edinburgh. JAMES A ROSS

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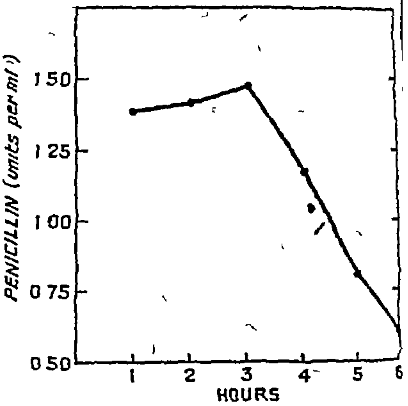
1 Julesz, M *Schweiz med Wschr* 1942, 72 541 *Ibid*, 1943, 73, 41
2 Fazekas J G *Acta med Szeged* 1949 12, 2
3 Deane, E H W *Lancet*, 1951 i 883
4 Stevenson F H *Ibid* ii 969
5 Mitchell J B *Brit med J* 1951 ii, 1492
6 Wynn Williams N *Ibid* p 1494

ORAL PROCAINE PENICILLIN WITH B

SIR,—In an earlier communication[1] we described action of relatively small and evidently non toxic of 'Benemid', (*p* [di-*n* propylsulphamyl] benzoic in blocking the tubular excretion of penicillin, and *evidence for a twofold to fourfold* increase in bloc levels after single doses of oral procaine penicillin patients receiving this drug The average blood leve obtained in 10 patients with a dose of 500,000 unit procaine penicillin by mouth were very encouraging but the variation in levels from patient to patient was large, and 4 of the 10 had levels at six hours below the minimum therapeutic concentration

A further attempt, therefore, has been made to determine whether oral penicillin, in higher dosage and in conjunction with benemid, could give more uniformly satisfactory blood level 10 patients were given 1 g (1,000,000 units) of procai penicillin in tablet form by mouth, together with 0 5 of benemid, every six hours for three days, and t blood-penicillin level was estimated hourly for six hou after the last dose In this way ample time was given f equilibrium to be reached in the action of benemid a any accumulation of blood-penicillin that occurred und its influence Details for the 10 patients are given in t accompanying *table, and the average levels in the* figu



Hourly blood-penicillin levels after last dose procaine penicillin 1 g (1,000 000 units) a benemid 0·5 g given six-hourly for three da Average of 10 patients

DETAILS OF 10 PATIENTS RECEIVING PROCAINE PENICILL 1 G (1,000,000 UNITS) AND BENEMID 0 5 G BY MOUTH EVE SIX HOURS FOR THREE DAYS SERUM-PENICILLIN LEVE AFTER LAST DOSE

Case no	Age (yr)	P S P excretion (%) *	Reducing substance (urine)	Serum penicillinl evels (units pe ml.) at 1–6 hours after last dos					
				1	2	3	4	5	6
1	40	(*a*) 87 5, (*b*) 71, (*c*) 75	Nil	1 6	1 6	3 2	0 8	0 4	0
2	60	(c) 81	Tr	3 2	3 2	3 2	3 2	1 6	0
3	28	(*a*) 84, (*b*) 76, (*c*) 92	Nil	1 6	0 8	0 8	0·4	0·4	0·
4	35	(*a*) 90, (*b*) 72, (c) 82	Nil	0 64	1 28	0 32	0 16	0 08	0·
5	41	(*a*) 84, (*b*) 31, (*c*) 64	Nil	2 56	2 56	2 56	2 56	2 56	2
6	42	(*a*) 66, (*b*) 41 (c) 69	Tr	0 08	0 16	0 16	0 16	0 16	0·
7	50	(c) 77	Tr	0 32	0 64	0·64	0 64	0 64	0·
8	63	(c) 81	Nil	2 56	2 56	2 56	2 56	1 28	0·
9	26	(*b*) 51 (c) 83	Nil	0 64	0 64	0 64	0 64	0 64	0·
10	23	(*c*) 69	Nil	0 64	0·64	0 64	0·64	0 32	0

* (*a*) Before administration of benemid (*b*) during administratio and (*c*) twenty four hours after last dose

As in the earlier series of 17 patients receiving benem the only abnormality attributable to this drug was t appearance in the urine (in 3 of these 10 patients) traces of a reducing substance, said to be a harmle conjugate of benemid In every case the return tubular function to normal within twenty-four hours

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1 Walker, W , Hunter R B *Lancet*, 1951, ii, 104

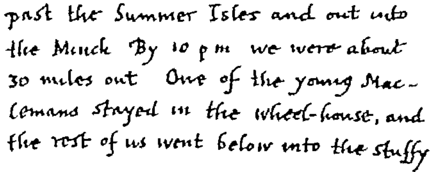
Body in a sound and perfect Health — as any one thing besides" He refutes Santorio's contention that ticks, lice and the like are generated from coalescence of "the heavier part of the perspiration. They must have animal parents, he said.

Quincy is matter-of-fact in his reference to the underlying problems of psychosomatic medicine: "What that *Nexus* or Bond of Union is between the Mind and the animal Fluids God Almighty only knows but there is not any one thing better confirmed by Experience than that they mutually influence one another" Gout he defines as an attempt by the body to rid itself of "sandy gritty saline Matter" and for this reason regards those who claim to cure it as "a drove of Robbers and Murtherers without the reach of the Law Nevertheless he believes in palliatives which can blunt "the Edges and Pains of rigid Particles." He concludes his *Dispensatory* by asserting that "the most general and necessary Rule in all Cases, is to answer the End by as few Medicines as possible and never to make a Cure worse than the Disease "Experience without Theory, he states in his *Lexicon* will never make a Physician, any more than Practice can be obtained without an Acquaintance with the Rules on which it is founded If there be anything of Science in Medicine it is conducted by Demonstration"

ON WRITING TO BE LEGIBLE

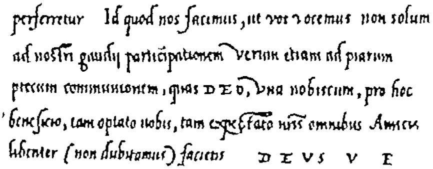
" Illegibility in writing, Robert Bridges held is a wider breach of good manners than indistinct utterance On this standard he must have encountered some shocking manners among his medical colleagues His own elegant fist however put him, for courtesy somewhere in the Sir Lancelot class; and Mr Aubrey West whose zeal for beautiful handwriting has driven him to the length of writing a book[1] about it fully shares Dr Bridges's view

Handwriting, as Mr West says, is everyman's handicraft; and he tells how it was invented—from the earliest picture writing where a man with arms flung wide signified no game found here to hieroglyphs and so to conventional alphabets. Thenceforth writing passed from the hands of scribes into those of any lettered man, and varied accordingly—not only with the fashion of the times but with personal idiosyncrasy It waxed and waned in legibility through the centuries, being sometimes crabbed and secret, sometimes open and graceful and sometimes elegant but obscure The story is intricate and Mr West has packed much—perhaps too much—into his little volume for his prose style does not flow from the same crystal spring as his handwriting and moreover he mistakenly supposes that his readers will all know nearly as much as he does about his favourite subject But he brings a refreshing enthusiasm to the work, and his illustrations, showing some of the prettiest hands imaginable make the book a pleasure and set the target for us humbler craftsmen Lord Cholmondeley who lately reformed his writing at the age of 62 is a great encouragement We reproduce one of Mr West's examples of a good modern hand; and also a line or two from that prince of schoolmasters, Roger Ascham, who helped to form the fine hand of Queen Elizabeth The exquisite flourishes of her prose style however, were all her own invention.



past the Summer Isles and out into
the Minch By 10 p m we were about
30 miles out One of the young Mac-
Lemans stayed in the wheel-house, and
the rest of us went below into the stuffy

Mr Ellic Howe's hand in 1951



perferretur Id quod nos facimus, ut vos vocemus non solum
ad nostri gaudij participationem verum etiam ad piarum
precum communionem, quas DEO, una nobiscum, pro hoc
beneficio, tam optato nobis, tam expectato nris omnibus Amicis
libenter (non dubitamus) facietis DEVS V E

Roger Ascham's hand in 1553.

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[1] Written by Hand. London: Allen & Unwin. 1951 Pp 71 7s 6d.

University of Oxford

Dr G W Corner director of the department of embryology of the Carnegie Institution, Johns Hopkins Medical School has been appointed as George Eastman visiting professor for 1952–53

University of Cambridge

On Dec 15 the following degrees were conferred

M.D.—N C London D H Mackenzie, B F Brearley H B Dodwell.

M.B., B.Chir.—*R A Sanford Patricia L Broadhead
* By proxy

University of London

At recent examinations the following were successful:

M.S. Branch I (surgery)—A. G Ellerker D. W Wells

M.S. Branch II (otology rhinology and laryngology)—J A Harpman

Order of St. John of Jerusalem

The King has sanctioned the following promotions in and appointments to, this order

As Knights.—Major E. S. B Hamilton, M.C. F.R.C.S. K. S Maurice-Smith, M.R.C.S.; F L. Newton M.B. Captain R V Steele M.B. Norman Manson O.B.E., M.B. Lieut.-Colonel C G Booker M.D. F L. Richard M.B.; Major-General Philip Mitchiner C.B., C.B.E., F.R.C.S.

As Commanders.—J T Whitley O.B.E. M.B. M C Lavin M.B. Colonel C H. S Redmond M.B. Brigadier W H du Plessis, O.B.E. M.R.C.S. Colonel O L Shearer C.B.E. M.B.; K N Dowd M.D.; Surgeon Captain Archie McCallum, O.B.E. M.D. F C Middleton M.B.E. M.D.; Sir William Coates K.C.B. O.B.E., F.R.C.S. F W Law F.R.C.S. Brigadier T W Davidson M.B.; C R de L Sadler M.R.C.S. Lieut.-Colonel G G L Stening M.B. W Ritchie Russell, F.R.C.P.

As Officers.—Francis MacLagan M.R.C.P. A D Broughton M.B., M.P. E M Dearn M.D.; G E. Bawdon, M.B. Captain G R H. Wrangham M.R.C.S., Captain J C Mead, F.R.C.S. H B. Stallard, M.B.E., F.R.C.S. W J Griffiths, M.B. F C O Mann, M.R.C.S. G W Gale, M.B. G W A Keddy F.R.C.S.; H. P Myers M.D. W F Warner O.B.E. M.B. W W King Brown M.B.; J G F Hosken M.R.C.S. Lieut.-Colonel F K. Mugford M.B. S. L A Manuwa O.B.E., F.R.C.S. R. W Harle M.B. D A. Bathgate M.B. N C. Speight, O.B.E., M.B. T H Pettit M.B. E. C Brewis M.B.; Major-General F K. Norris C.B.E. D.S.O. M.C.; E A Dalor M.B.

As Associate Officer.—Julius Cohen M.R.C.S.

King Edward's Hospital Fund for London

The King's Fund has received a further instalment of £50,000 from the Nuffield Trust for the Special Areas In founding this Trust Lord Nuffield provided that the repayments of loans or other sums available from this trust should pass to the King's Fund. A total of £1 400,000 has now been received.

Lady Tata Trust

The trustees of the Lady Tata Memorial Fund invite applications for grants, scholarships, or fellowships for research on diseases of the blood with special reference to leukæmia, in the academic year beginning on Oct 1, 1952 Grants are made for research expenses or to provide scientific or technical assistants for senior workers. Scholarships are awarded for the personal remuneration of workers carrying out research under suitable direction; their normal value will be at the rate of £600 per annum for whole time research. In addition, the trustees may award one or more fellowships at the rate of £1000 per annum to workers with considerable research experience Forms of application may be had from the secretary of the scientific advisory committee, c/o Medical Research Council, 38 Old Queen Street London, S W 1 Applications must be submitted before March 31

Dinner to Lord Horder

Last Monday a dinner in honour of Lord Horder's 81st birthday was given at the Royal Automobile Club by his former house physicians. Dr A F S Sladden, as senior house physician presided and the toast of *Our Teacher* was proposed by Dr C A Hinds-Howell supported by Sir Hugh Griffiths It was recalled that Lord Horder dedicated his medical notes to his own teacher *Samuel Gee*

Besides those mentioned the company comprised

Dr Geoffrey Bourne Lieut.-Colonel W V Cruden, Dr F R Cullinan Dr E. M. Darmady Prof. I de Burgh Daly, F.R.S. Dr J Dockray Dr C N Evans Dr A E Gow Dr F R. H. Green Dr P F T Hancock Dr R. S Johnson Prof Robert Knox, Dr A W D Leishman Dr W H McMenemey Dr H W Maltby Dr B C Nicholson, Dr C H Prowse Dr A C Roxburgh, Dr H W Toms Dr H Tothill, Dr E E Vergette and Dr F L. S Willis.

St Philip's Hospital

The Sheffield Street Hospital, Kingsway, London, W C 2, has become part of the group of teaching hospitals known as St Peter's and St Paul's, and has been renamed St Philip's It has 57 beds for chronic urological cases

Medical Research Council

Pigott Wernher Travelling Fellowships in Ophthalmology and Otology 1952–53 —The council invite applications for these fellowships from medical graduates who are likely to profit by a period of work in ophthalmology or otology at a centre abroad before taking up positions for higher teaching and research in these branches of medical science The awards will, as a rule, be tenable for one year

The fellowships provide for the payment of a stipend (£650 per annum for a single fellow and £900 for a married fellow), together with an allowance for travelling and incidental expenses Forms of application may be had from the secretary of the council, 38, Old Queen Street, London, S W 1, and must be returned by March 31, 1952

EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1294 The proportion admitted was 85 23%

Appointments

BALLANTINE R. I, M R C S D A. consultant, department of anæsthesia, St Bartholomew's Hospital, London.

DICKIE, G G M.B Aberd. D P H M O H Aberdeenshire

HUTTON, JAMES M D Edin, D P H M O H, school M O, and port M.O. of the borough and county of Poole, and M.O, Poole area of Dorset

Manchester Regional Hospital Board :

BURSLEM R W, M D Manc, M.R C O G consultant obstetrician and gynæcologist, Withington Hospital Manchester

DENT R V, M B Camb, M R.C.P consultant general physician, Crumpsall Hospital Manchester

MILNE, M D, M D Manc M R.C P consultant general physician, Crumpsall Hospital Manchester

North-East Metropolitan Regional Hospital Board :

ATLAS, ROMAN, M D Lwow part time asst venereologist (S H M O) Prince of Wales's Hospital, London

BURBURY, WINIFRED M A, M B Lond, D P M part time consultant psychiatrist, St John's Hospital, Chelmsford

DE WINTER, EDITH M D Prague, D A. asst anæsthetist (S H M O), Chase Farm Hospital

DOHERTY W F O'M M B N U I, D.A part time consultant anæsthetist, North Middlesex Hospital

DUNLOP, E M C, M D Lond, M R C.P part time consultant venereologist, Oldchurch Chelmsford and Essex and Tilbury and Riverside (Tilbury Branch) Hospitals

THOMAS J C SAWLE, M R C P D P M part time consultant psychiatrist Prince of Wales's Hospital, London

TOOLEY, P H, M D Lond M.R C P D P M part time consultant psychiatrist St Clement's Hospital London

VINCENZI J E G, M R C S, D P.M part time *asst psychiatrist* (S H M O), Chelmsford Child Guidance Clinic and Walthamstow Child Guidance Clinic

South-East Metropolitan Regional Hospital Board

CHAMBERLAIN, J A, M D Lond, M R C P consultant chest physician mid Kent group of hospitals

ELLIOTT R I K, M A B M Oxfd consultant pathologist, Brighton and Lewes group of hospitals

FITZGERALD, M A, M B N U I, D M.R. consultant radiologist, Hastings group of hospitals

HAGGIE M H K M C, B A M D Camb M.R C P consultant physician South East Kent group of hospitals

HERMAN F G M A, M B Camb asst pathologist, Dartford/Sidcup and Swanley groups of hospitals

MACARTHUR A M, M B Lond F R C S consultant thoracic surgeon, thoracic surgical units, Brook Hospital (Woolwich group) Grove Park Hospital (Lewisham group) and Preston Hall Hospital

MOORE B P M B Lond, F R C S consultant thoracic surgeon, above hospitals

MORRISON, N D W, M R C S, D M R D consultant radiologist, Lewisham group of hospitals

Western Regional Hospital Board (Scotland)

BUCHANAN, A M L.R C P F *asst psychiatrist Ravenscraig* Mental Hospital

DAVIDSON W M B M B Glasg asst pathologist Stobhill Hospital Glasgow

MACCAMMOND IAIN, M B Glasg, D P M deputy physician superintendent *Bellsdyke Mental Hospital*

TAYLOR, RHODA M B Edin asst pathologist, Stobhill Hospital, Glasgow

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N H S hospital posts we advertise, unless otherwise stated Canvassing disqualifies but candidates may normally visit the hospital by appointment

Diary of the Week

JAN 13 TO 19

Monday, 14th

ROYAL EYE HOSPITAL, St. George's Circus Southwark S.E.1
5 P M Dr T H Whittington Non paralytic Strabismus.
INSTITUTE OF PSYCHIATRY Maudsley Hospital Denmark Hill, S.E.5
5 30 P M Dr E Stengel Lecture demonstration
HUNTERIAN SOCIETY
8 30 P M (Mansion House E C 4) Prof C W Löffler (Zürich) Endocarditis
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W 1
8 30 P.M Prof E. J Wayne, Mr H. Miller, PH.D Radioactive Isotopes

Tuesday, 15th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S W.1
5 P M Dr J H Kellgren Some Concepts of Rheumatic Disease (First Goulstonian lecture)
BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene, Keppel Street, W C 1) Prof H Dingle, D.SC The Philosophy of Science
INSTITUTE OF DERMATOLOGY, St John's Hospital, Lisle Street, W.C 2
5 30 P M Dr L Forman Skin Manifestations of Malignant Diseases
CHELSEA CLINICAL SOCIETY
8 30 P M (South Kensington Hotel, 41, Queensgate Terrace, S W 7) Dr Raymond Greene Mount Everest
MANCHESTER MEDICAL SOCIETY
4 30 P.M (Physiology Theatre, Medical School, University of Manchester) Dr Donald Hunter The Clinical Significance of Studies of Bone Metabolism

Wednesday, 16th

INSTITUTE OF DERMATOLOGY
5 30 P M Dr R. W Riddell *Mycology—Actinomycosis and Nocardiosis.*
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St Vincent Street, Glasgow, C 2
5 P M. Prof R A Willis Misnomers in Tumour Nomenclature (Finlayson lecture)

Thursday, 17th

ROYAL COLLEGE OF PHYSICIANS
5 P M Dr Kellgren Some Concepts of Rheumatic Disease *(Last Goulstonian lecture)*
ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W C 2
5 P M Prof Arnold Sorsby Corneal Infections and their Specific Treatment
FACULTY OF RADIOLOGISTS
8 P M (British Institute of Radiology, 32 Welbeck Street, W 1 Dr J W D Bull Intracranial Tumours in Children
BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P.M Sir Geoffrey Jefferson, F R.S. Fundamentals of Cortical Physiology
ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner S W
4.30 P M. Sir Paul Mallinson *Psychiatry lecture demonstration*
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE Manson House, 26, Portland Place W 1
7 30 P M Dr Ernest Muir The Treatment of Leprosy with D D S Dr R G Cochrane The Action of Sulphones in Leprosy.
LONDON JEWISH HOSPITAL MEDICAL SOCIETY
8 30 P M (11, Chandos Street, W 1) *Prof John Yudkin* Nutritional Assessment of the Individual
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool,
8 P M Mr W A Lee *Our Heritage—The Origin and Development of the Liverpool Medical Institution.*
UNIVERSITY OF ST ANDREWS
5 P M (Medical School Small's Wynd Dundee) Dr J E McCartney *Application* of the Electron Microscope to Bacteriology

Friday, 18th

FACULTY OF RADIOLOGISTS
5 P M (Royal College of Surgeons) Prof. Norman Dott, Mr John Gillingham, Dr Martin Bodian Intracranial Tumours in Children
8 15 P M. (1 Wimpole Street, W 1) Mr J Jackson Richmond Dr Edith Paterson : Intracranial Tumours in Children.
INSTITUTE OF DERMATOLOGY
5 30 P M Dr W R Bett Medical Writing
INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY
5 30 P M *(London School of Hygiene)* Dr Aubrey Leatham Techniques of Investigation

Saturday, 19th

BIOCHEMICAL SOCIETY
10 30 A.M (Middlesex Hospital Medical School W 1) Scientific papers

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CORRIGENDA *Infestation of the Human Brain with Cœnurus cerebralis* —The reference by Dr Becker and Dr Jacobson (Dec 29 1951 p 1202) to their earlier paper should have read (1951) *Lancet*, ii, 198

Mr Charles Drew, who was appointed M V O in the New Year Honours list, was appointed fourth assistant surgeon to Westminster Hospital last year

THE TREATMENT OF PEPTIC ULCER

JOHN W TODD
M.D Lond M.R.C.P
CONSULTANT PHYSICIAN FARNHAM HOSPITAL, SURREY

THE literature of peptic ulcer in recent years has been larger perhaps than that of any other disorder culminating in Ivy, Grossman and Bachrach's book in 1950 which has over 1100 pages on the subject, including 220 on treatment. And the number of remedies variously advocated is remarkable including rest reorganisation of the patient's life psychotherapy radiotherapy diets of all sorts, one or other alkali sedative drugs belladonna, olive oil vitamins, certain drugs said to be curative such as histidine eradication of septic foci, prohibition of alcohol and tobacco and numerous operations including gastrectomy, gastro-enterostomy and vagotomy Yet there is a great lack of agreement as to what remedies should be used in any particular circumstance. Even recognised gastro-enterological specialists may give quite different advice to the same patient One may for example, order six weeks in bed and three months absence from work, and another no bed and only two weeks absence from work or one may allow no food but citrated milk at short intervals for the first few weeks, and no alkali, and another a liberal and varied diet with repeated alkali

Polypharmacy has been derided in the higher medical circles for many years, and the prescriber of a physic containing seven or eight different drugs, each with a separate purpose may be condemned as a quack But the specialist in gastro-enterology may not hesitate to pronounce ex cathedra that rest a complex dietary scheme the cessation of tobacco-smoking olive oil the eradication of septic foci a change of attitude to anxieties, alkali at specified intervals and belladonna are all indicated for peptic ulcer; and to some of them he may apply the strong word *essential* Why should polypharmacy with remedies other than drugs still be considered sound?

Further doubts as to these remedies should be induced by the natural history of the disease For without any treatment beyond the instinctive practice of eating when hunger pain is felt the symptoms of peptic ulcer often wax and wane and may disappear altogether for long periods, even for years. The following case well illustrates this:

The patient was a regular officer in the Royal Navy from 1918 to 1947 From 1919 to 1921 he had occasional spasms of pain lasting a few days and in 1922 severe pain for two weeks. From 1923 to 1927 there were no serious attacks In 1928 and 1929 he was *rarely free of pain for more than* a few days and had a severe bout lasting two weeks From 1930 to 1932 he was in a cruiser on the American station; whenever ashore he indulged in an endless round of festivities, he was rarely quite sober and he had many bad spasms of pain lasting a few days. In 1932 and 1933 he was stationed at Portsmouth and had only occasional pain, for which he took, for the first time an alkaline powder (Maclean's) with striking relief (He continued to take this powder until 1950 whenever he had pain.) In November 1933 he had melæna for two weeks becoming so pale and ill that he spent eight weeks in Haslar Hospital For a period afterwards he did not smoke or drink and avoided the traditional dishes forbidden to peptic ulcer subjects, but he soon returned to his usual habits. From 1934 to 1938 he had little pain In February 1939 when in a troopship he had intense pain and vomiting and operation was contemplated From 1940 to 1947 he had occasional spells of pain with relief from Maclean's powder In 1948 he had a few brief spasms during the first nine months and frequent severe attacks in October and November In 1949 the pain was infrequent until November when he was referred to me because of a severe attack, saying that he had had very severe pain for a week, which had not been eased much (as it usually was) by food or alkali and he had vomited several times, with relief There was no definite abdominal tenderness or other physical signs. Barium meal X ray report (Dr C. A Grant) was 'duodenal ulcer present with some scar formation.' Since then he has remained well except for a brief spasm in July 1950

Apart from the period after he had melæna in 1933, this patient never dieted except when actually in pain. He smoked 20–30 cigarettes daily and drank a great deal throughout except during the same period Until November 1949 since when he has taken aluminium hydroxide tablets fairly frequently he rarely had alkali except to relieve pain.

A paper by Gill (1947) also illustrates how ulcers can heal without proper treatment

> A consecutive series of 20 patients each with a chronic gastric ulcer were given a daily hypodermic injection of 1 c cm. of distilled water They were ambulant, their diet was unrestricted and even disregarded, they were given no medicines and those who enjoyed smoking were encouraged to continue
>
> With one exception all lost their pains as quickly—i e., within a few days—as a control series treated along orthodox lines. Healing of the ulcers was observed gastroscopically and took place in the usual time—i.e in 4–8 weeks from the start of treatment.

Accordingly claims that a remedy can do more for peptic ulcer than cause immediate symptomatic relief should be viewed with suspicion As a corollary it is very dangerous to use the word *cure* in connection with this disease

CRITERIA

An attempt should be made to assess the value of any remedy for peptic ulcer as regards (1) the immediate symptomatic relief, (2) its influence in healing the lesion, and (3) its ability to change the natural course of the disease

It is easy to see whether a remedy causes immediate symptomatic relief to any particular patient and not difficult to decide whether it gives such relief generally But because of the natural tendency of ulcers to heal it is far from easy to be sure that a remedy has been responsible for the healing And as several remedies are usually given simultaneously, it may be impossible to decide which one is particularly effective even if it seems certain that the combination is successful To solve the problem unequivocally in the case of any single remedy controlled series of patients are needed half of whom are given a standard combination of remedies or nothing at all while the other half are given this standard combination with the addition of the remedy in question or this remedy alone As an additional complication it is unjustifiable to withhold all treatment, since patients can be given immediate symptomatic relief and remedies giving such relief may also have some influence in actually healing the ulcer Controlled series of this kind on a satisfactorily large scale do not seem to have been published

It is even harder to reach conclusions about the ability of remedies to influence the natural course of the disease over a long period since all the complicating factors just noted are equally present here and a controlled series would involve close observations over many years Moreover if the remedy to be tested—say a diet or drug—is to be given continuously for a very long time with the idea of preventing recurrences it will be extremely difficult to persuade patients regularly to carry out their instructions, when they may have been free of symptoms for months or years On the other hand when the remedy is an operation or a short course of treatment the necessary long term observations will be easier to make But even here the complication may arise of those who relapse and have to be given further treatment for its purely symptomatic effect

The Certainly Valuable Remedies

Is it then possible to be certain that any remedies are effective for peptic ulcer?

DIMINISHING ACIDITY

Diminishing the acidity of the gastric juice, whether by milk, food, or actual alkalis, gives immediate relief to the pain of numerous subjects with peptic, and especially duodenal, ulcer. That this same remedy can encourage ulcers to heal is perhaps not proven with certainty. Nevertheless, since persistent achlorhydria is never associated with peptic ulcer, the conclusion that causing hypochlorhydria should encourage healing seems justified. And there have been series of cases (e.g., Winklestein et al. 1942) of enormous and very chronic ulcers healing while the patients are having continuous intragastric drip of aluminium phosphate, other alkali, or milk. It also seems highly probable that if a diminished acid level in the stomach is maintained indefinitely by the patient's continuing to have frequent meals or alkali, even the natural history of the disease can be changed, by preventing recurrences.

It should be noted here that, according to the experiments of Nicol (1939), Douthwaite (1947), and others, even large frequent doses of alkalis or hourly feeds of milk or other foods have surprisingly little effect in reducing the level of free acid in the stomach. These results, though interesting, cannot be taken as proof that such measures do not encourage the healing of ulcers. This matter should be finally judged, not by the evidence of the laboratory, but by the rapidity of disappearance of symptoms or of ulcer craters radiographically or gastroscopically, as assessed by large controlled series.

PSYCHOTHERAPY

It has been established by statistical analyses, notably that of Davies and Wilson (1937), that emotional disturbances can sometimes precipitate relapses of peptic ulcer. The prevention of such disturbances should therefore prevent relapses. But in practice it may be difficult or impossible sensibly to influence a patient's emotional state. If a business man's firm is in financial trouble and he is suffering much from his ulcer, or if a woman whose husband is having affairs with other women has hæmatemeses, soothing words from the doctor cannot help. And when an ulcer subject of highly nervous temperament is constantly worrying about matters which seem to others trivial, talking to him can hardly make him calm and phlegmatic. Even when it may be practicable to influence a man's emotional state—say by advising him to give up some worrying though non-essential activities—it is questionable whether this is always the right course. For although emotional tension may thereby be lessened, a sense of inferiority at having abandoned the fight or of depression may take its place. Moreover, many men given this sort of advice would refuse it, taking the reasonable view that they would rather continue in their usual habits and accept the risk of recurrence of their ulcers. Only in the comparatively rare circumstance when the doctor is able to discover some unnecessary worry—say the fear of cancer—which by reassurance he can relieve is psychotherapy likely to give unqualified help. One worry of this kind is that actually bound up with the ulcer itself. The patient may, perhaps, be filled with foreboding about his future, because of the disasters which he has heard can happen to the victims of his disease.

In spite of its attractiveness in theory, we may conclude that in practice psychotherapy is of little help in the treatment of peptic ulcer. And in so far as it is valuable it should be given because a patient is emotionally upset, whether or not he is also liable to peptic ulceration.

GASTRECTOMY

A third certainly valuable remedy is gastrectomy. There can be no question of performing an operation of this magnitude merely to cause immediate sympt relief, or even to remove a piece of stomach bearing an active ulcer. The only justification for gastr must be that it can so change the natural history of the disease as to prevent further peptic ulceration in the future. To prove that a remedy can do this is, as was noted above, extremely difficult; but the large number of gastrectomies that have now been done, and the many long follow-ups, show that a high proportion of those who have had this operation remain free of peptic ulceration indefinitely. On the other hand, gastrectomy carries with it obvious disadvantages. In the first place, it has a considerable operative mortality. Secondly, it is inevitably followed by at least a period of weeks in which the patient is a semi-invalid. Thirdly, many who have had the operation suffer from troublesome, and sometimes incapacitating, dyspeptic, and other symptoms. And fourthly, it cannot guarantee cure. Some of those who have had most extensive gastrectomies develop further ulceration; and their state can be pitiable. Evidently, therefore, gastrectomy is far from being the perfect remedy.

Other Remedies

REST AND CHANGE OF ACTIVITY

The value of rest has been emphasised in standard textbooks and articles for many years. Avery Jones (1949), in a refresher course for general practitioners, which may be taken as the "orthodox" present-day approach, says of duodenal ulcer: "The treatment of choice, especially for patients with a recent history, is initial rest in bed. . . . Six weeks rest in bed is desirable. . . . Rest in bed almost certainly favours the healing process. . . ." For gastric ulcer he also advocates rest in bed "until healing takes place. This may be within three weeks, but it may need *several months*" (my italics).

Yet many ulcers heal, and their subjects become free of symptoms, without rest. Davies (1936) gave ambulatory treatment to 130 patients with gastric ulcer and 163 with duodenal ulcer, and followed them for periods of between six months and five years. 97 of those with gastric ulcer became and remained symptom-free, of whom 76 had no subsequent radiological abnormality, 21 were not radiographed again, and 7 retained persistent ulcer craters. 26 had recurrence of symptoms; in 20 of these a crater was demonstrated and in 6 there was no crater. 123 of those with duodenal ulcer became symptom-free, 25 had recurrence of symptoms, and 10 had persistent symptoms. Many other observers (e.g., Blackford and Bowers 1929, Ferriman 1940) have published similar conclusions. And, as has already been noted, without any treatment at all many ulcers heal. Moreover, it could not possibly be pretended that rest, of whatever degree and duration, can prevent a patient developing further peptic ulcers in later life, however perfectly his ulcer was healed at the end of his rest period.

The maximum benefit that can justly be attributed to rest is, therefore, that it may enable a proportion of ulcers to heal that would otherwise have remained unhealed. But there is no clear evidence in favour even of this; and the only means of obtaining such evidence is observation of large controlled series with a long follow-up. If the problem is examined a priori, it is very hard to see why *bodily* rest should be beneficial. Presumably, the organ which is supposedly rested by the treatment is the stomach, and it is far from apparent why the mere act of lying in bed should have this effect. If bodily rest is beneficial, one might expect that those normally engaged in physically arduous occupations would be more liable to ulcer than sedentary workers, whereas the statistics suggest that the reverse is true There are, indeed good grounds for supposing that mental rest may aid the healing of ulcers, but the man in bed is not necessarily (though he may be sometimes) rested mentally often staying in bed increases his anxiety Certainly, if mental rest is the end in view, it should not be attempted by the routine prescription of rest in bed *Rather should each patient's personality and circumstances be studied in an attempt to determine how best his mind may be rested*

If there is much doubt about the value of rest, there can be no doubt about the harm which it can do At the very least it disorganises the patient's life for a minimum period of some two months, since those physicians who would keep him in bed for the recommended six weeks presumably would insist on his staying away from work for at least another two or three weeks As a result he will probably suffer financial loss, and may even be dismissed from his job If he is intelligent he will almost certainly be worried by having to rest. For if after a few days his pain has disappeared and he makes the natural request that he be allowed up, the least he can be told is that if he insists on doing this his ulcer will not heal and if he is still not satisfied the doctor may speak of such disasters as perforation or hæmorrhage as stronger deterrents He may also wonder what will happen when he next has an attack—will he again perhaps in six months or a year have to spend another six weeks in bed ? Finally rest in bed may be apparently responsible for certain grave bodily disasters, such as pulmonary emboli and basal pneumonia though, as most ulcer subjects are allowed at least bathroom privileges, these disasters are no doubt rare

It therefore seems clear that the arguments against outweigh the arguments for the routine use of rest in bed for peptic ulcer *Yet there may still be justification for advising bed for a group of patients—namely those with* pain so severe that it cannot be relieved when they are going about their usual business. These will probably be less uncomfortable in bed, while there they can more easily be given regular analgesic drugs and such intensive medical treatment as continuous intragastric alkaline or milk drip

Even if it were proven that rest in bed is a factor in encouraging ulcers to heal and in hindering relapses, why should it be given routinely when it is certain that many ulcers will heal without it ? The man whose ulcer is healing more slowly by his remaining at work is coming to no harm in the short run if he can be kept free of pain by intensive alkalinisation In the long run the man who works through one attack and through a relapse may be better off than the man who has six weeks in bed and two months absence from work for the first attack and for his relapse, even though this comes much later It may be argued a priori, that the delay in healing caused by lack of rest might make the ulcer chronic. But this argument is of highly doubtful validity (1) because a high proportion of ulcer subjects have had their symptoms for months or years when they first seek medical attention and (2) because some very large long standing ulcers heal satisfactorily

A similar conclusion can be reached about degrees of rest less than confinement to bed and about other kinds of vague advice bound up with minor degrees of rest such as missing work taking a long holiday changing the tempo of existence dropping various commitments, changing the occupation and retiring altogether The objections to these measures are obvious whether they are beneficial is most doubtful except in so far as a patient's ulcer is bound up with emotional stress and these measures diminish this stress (which they do not necessarily do) and in so far as they make it easier to carry out the procedures which diminish the acidity of the stomach Thus, the routine practice should be to treat the patient while he is going about his ordinary business (unless his pain is so severe as to make this impracticable) Only if he fails to become well or stay well should these general measures even be considered

DIET

To the extent that dietary measures diminish gastric acidity there can be no doubt of their value *It is also* clear that someone with a peptic ulcer who is regularly upset by a particular article of diet should avoid it ; and this is equally true where there is no ulcer But there does not seem to be any uniformity between peptic ulcer subjects as to the articles of diet which are *immediately* upsetting Indeed in the past I was so often surprised by what patients told me they could or could not eat that I have ceased to think any statement on this matter surprising The situation is complicated by the fact that nearly everyone ' knows ' that people with peptic ulcer should live on mince and slops so when a patient is asked whether say roast beef and Yorkshire pudding make him ill he may say yes, not because experience has shown him that this is so but because he assumes that if he did eat them he would be made ill On the other hand many patients say that the severity of their symptoms is quite uninfluenced by what they eat

Although there are considerable differences of opinion as to the appropriate diet for peptic ulcer (many gastroenterological physicians have their own special schedules, some of which such as those of Sippy and Hurst have become famous) it seems to be widely believed that the following four principles are important

(1) The meals are taken frequently

(2) Some of the articles notably milk and milk dishes are specially effective as neutralisers.

(3) The meals are small

(4) The foodstuffs are believed to be ' bland ' —that is, they contain no pips, lumps cellulose spices, or other substances which might irritate the ulcer

The soundness of the first two principles cannot be questioned since frequent feeding diminishes the gastric acidity and may also prevent pain if as is often the case, this only comes on a considerable interval after meals. But whether the application of these principles is better than giving frequent alkali is a matter which will be considered later If meals are frequent most of them are bound to be small but if a patient, while submitting to this general routine can enjoy one large meal a day and feel no immediate ill effect there seems no reason to forbid it. That the presence in the stomach of a large bulk of food prevents an ulcer from healing is an unproved assumption

There is also no proof that the avoidance of certain foods thought to be irritating unless they cause immediate distress is beneficial *Why should the chewed remnants* of a hard boiled egg roast beef the crusts of new bread sauces salads and skins—articles traditionally forbidden —be harmful ? It seems naïve to suppose that they attack the ulcer and if they do not why should they prevent it from healing ?

It may therefore be concluded that there is no proven virtue in special diets over and above their influence in diminishing the acidity of the stomach (unless in the individual case some article is found by experience to be upsetting)

DRUGS OTHER THAN ALKALIS

Sedatives

Sedatives particularly phenobarbitone have become increasingly popular and according to Avery Jones (1049) ' The most important single drug in the management of peptic ulcer is phenobarbitone *given in sufficient* doses to have the desired effect of sedation *Evidence of* the value of the drug derived from controlled series, half of whom are given it and half are not being unavailable the problem can only be examined a priori. The theoretical basis for the use of phenobarbitone is that peptic ulcer is "psychosomatic," and that the drug, by calming a troubled mind, may encourage an ulcer to heal. It may thus be asked to what extent is it possible to allay, say, some haunting anxiety or to give a naturally anxious man peace of mind by phenobarbitone. If so much drug is given that the patient becomes stuporose, it may no doubt have some such effect, but if the dose is small enough to leave his mental processes still working satisfactorily—as is the usual practice—it seems most improbable that it will have a striking effect. When it is also considered that many subjects with peptic ulcer have little apparent psychiatric disturbance, the benefits likely to be given by the drug seem small. And it has the disadvantage of causing some mental dulling, and in many cases depression.

Belladonna

In so far as this drug has some influence in diminishing gastric secretion, it is presumably useful. But this antacid effect seems extremely slight. According to Nicol (1939), who made observations with twenty-four-hour gastric analyses, even large doses of atropine apparently have very little influence on the acid of the stomach, and Douthwaite (1947) reaches a similar conclusion. In this respect, therefore, belladonna is probably not worth giving. The drug may diminish the muscle tone of the alimentary tract, and thereby relieve the pain of spasm; but there seems to be no evidence that it can actually encourage an ulcer to heal.

Histidine, Enterogastrone, and Other Drugs

Finally there are a number of drugs which have been claimed to have some specific effect in healing ulcers; most have had only a short phase of popularity. Some years ago histidine was widely used with enthusiasm and more recently enterogastrone, a substance produced by the intestinal mucosa, and 'Robuden,' a watery extract prepared from the wall of the stomach and intestines of animals, have been advocated. Evidence derived from large controlled series to support the use of most of these drugs does not appear to have been published, whereas there is such evidence to condemn some of them. Stolte (1950), for example, has shown that patients having robuden progressed no better than those having a placebo, the results in both groups being very good. Probably the most important reason for the enthusiasm for these drugs is that peptic ulcers often heal spontaneously, the credit being given to the drug, not to the *vis medicatrix naturæ*. It is sometimes suggested that the doctor's enthusiasm for a drug may be transferred to the patient, with the result that his consequent peace of mind aids the ulcer to heal. But it hardly seems necessary to hypothesise this mechanism as a rule, for ulcers often heal without any treatment or apparent change in the patient's state of mind.

Ivy et al. (1950) have published evidence suggesting that enterogastrone may favourably affect the course of peptic ulcer. They gave a preparation of it intramuscularly to 36 patients who for several years had had frequent recurrences, and thereafter there was a significant drop in the number of recurrences. They nevertheless conclude that there is "no evidence to show that the present enterogastrone containing preparation is superior to ordinary medical management for the majority of patients with peptic ulcer, particularly in view of the inconvenience, the cost of the product, and the imperfect results."

ERADICATION OF SEPTIC FOCI

The substitution of the "psychosomatic" hypothesis for the "septic focus" hypothesis in the ætiology of peptic ulcer has naturally lessened the enthusiasm for dicating septic foci as a therapeutic measure. But even in the latest textbooks and articles on peptic ulcer this remedy may still be given a prominent place. Bentley (1950), for example, says: "oral hygiene is obviously essential." If a man has caries so bad as to give him much toothache, or pyorrhœa so bad as to make his teeth loose, his breath offensive, and his appearance unpleasant, it may be conceded that he "obviously" needs dental attention, whether or not he also has a *peptic ulcer*. *But there seems to be no real* reason to suppose that his ulcer will be encouraged to heal by attending to his teeth. Indeed, there is much presumptive evidence against this view. Thus, Davies (1936) says:

> "For the past five years I have deliberately withheld any advice regarding attention to septic foci, and since relief from symptoms and healing of crater occurred in such a high proportion of the patients—most of whom came from the out-patient class among whom oral sepsis is certainly not uncommon—it is difficult to believe that sepsis plays any part in the initiation of peptic ulcer."

If a peptic ulcer subject has a septic focus, this should be treated entirely on its own merits.

OMITTING TOBACCO AND ALCOHOL

A few years ago it was the common practice to "forbid" tobacco in treating peptic ulcer; it is now usual merely to advise moderation in its consumption. Bentley (1950) says:

> "The abuse of smoking should be checked, like all abuses, if the patient is anxious to be helped, but there is no evidence that smoking in moderation affects gastric secretion, or harms the ulcer patient; about 10 cigarettes a day is a fair compromise."

But why should the number 10 be picked upon? There is surely *no evidence that* 20 *cigarettes* a *day* restrain an ulcer from healing, while 10 do not. If a man is a heavy smoker he may reasonably be advised to cut down or cut out tobacco because his habit burns away a high proportion of the *family income, but there* seems no good reason for supposing that his ulcer will thereby be encouraged to heal.

Alcohol is apparently considered more malign than tobacco, and its *prohibition, at* least *in the early phases* of treatment, is still widely recommended. According to Avery Jones (1949) "Alcohol is best omitted for six months and then allowed in strict moderation." Perhaps this view mainly depends on the *fact* that alcoholic drinks go straight down to the stomach, where they may be supposed to irritate the ulcer. But there seems to be no proof of this theory, and if a patient enjoys and is not immediately upset by a regular *glass* of some *alcoholic* drink, there is probably no reason why he should be dissuaded from having it.

OPERATIONS OTHER THAN GASTRECTOMY

Gastro enterostomy

This operation provides a good object lesson of the difficulty of judging the value of remedies for peptic ulcer. Its immediate results seemed so good that for a period it was very popular; but a considerable proportion of those who had had the operation developed anastomotic ulcers, often after a lapse of many years, and were probably far worse off than they would have been had they been left alone. Nevertheless, since gastro enterostomy is much simpler than gastrectomy and is less likely to be followed by immediate ill effects, for those with pyloric stenosis, especially if old and feeble, without doubt it is the operation of choice, since they are unlikely to develop anastomotic ulceration and may die after gastrectomy. In most other circumstances it should probably not be done, though it is difficult to weigh in the balance the immediate advantages of the operation (by comparison with gastrectomy) and its long term disadvantages.

Vagotomy

The immediate results of vagotomy are apparently good. A high proportion of those having it rapidly become free of pain and their ulcers soon heal. But as has often been emphasised recently it is far too soon to assess the ultimate value of the operation. Already it is clear that further ulceration may occur and sometimes be severe and deep even to the extent of causing perforation, while the patient remains free of pain. Moreover it is possible that the division of the vagi may in the long run harm the liver, pancreas, and small intestine. Nevertheless, for duodenal ulcer which if treated by gastrectomy is much more liable to be followed by further ulceration than is gastric ulcer vagotomy combined with gastro-enterostomy may perhaps have a useful place. As Palmer et al. (1951) have pointed out, this combined operation has a low mortality, the results so far seem satisfactory, and the "bridges are not burned" so that if further ulceration does occur gastrectomy can still be done.

OTHER METHODS OF TREATMENT

Besides those already enumerated, many other methods of treating peptic ulcer have been tried at various times, including repeated aspiration of the stomach contents, the "fasting treatment," regular olive oil, radiotherapy, ligation of the gastric arteries, and many drugs. Most of them have never been widely used and the arguments in their favour seem in general to be no better than those supporting the remedies just considered.

Discussion

If my arguments have been sound, the means of treating peptic ulcer which are of proven value are (1) diminishing the acidity of the gastric juice, (2) gastrectomy, and (3) psychotherapy. The third remedy though apparently attractive, is severely limited in its practical application. In so far as it is effective, it should be given not so much because it may favourably influence the course of an ulcer as because it improves the patient's state of mind—a desirable end whether or not he is liable to ulcer. The important questions yet to be answered are therefore what is the best means of diminishing the acidity of the gastric juice in practice and how long should this procedure be continued, and what are the indications for gastrectomy?

Gastric acidity can be diminished either by diet or by giving alkalis. Perhaps those patients—not rarely seen at the present time—who have a deep-seated distrust of "drugs" are best treated by diet. But leaving aside prejudices, it is simpler for the patient to carry alkali about with him and swallow it frequently than to carry biscuits, sandwiches, or a bottle of milk. Moreover the man who is always eating is denied one of the pleasures of life—of sitting down to a meal with a hearty appetite. It may be argued that it is bad psychologically to be constantly dependent on drugs, but is it not at least as bad to know that one can never eat the same meals as other men? Is not the latter situation more likely than the former to make a patient feel himself an invalid? The man on the alkaline régime can be told with conviction—and should be told repeatedly—that in every respect but his alkali he must consider himself as other men. It is hardly possible similarly to convince the patient on a diet which involves preparing special dishes, refusing invitations, and breaking off work to get milk or biscuits.

It does not seem to matter which of a wide range of alkalis is used. But tablets are more convenient than powders or emulsions because they can be carried about in a box and swallowed without difficulty or embarrassment. It seems reasonable to prescribe a large dose at short intervals, provided an alkali which never causes alkalosis is used. At least the alkali should be taken often enough to prevent pain, if that is possible. Probably a satisfactory routine is to advise the patient never to go longer than one hour from getting up to going to bed, without taking two 7 grain tablets of aluminium hydroxide or other alkali except at the usual meal times, when he has his ordinary food (perhaps with milk) instead. If he wakes at night he should take a further dose of tablets. Unless his symptoms are incapacitating he should carry on with his work and all usual activities.

If the patient soon becomes symptom free on this régime he should persevere with it at least until his ulcer is thought to be healed. In the case of gastric ulcer, good evidence on this point can be obtained from radiography or gastroscopy, but gastroscopy is useless in studying duodenal ulcers, and radiography is of comparatively small value since the absence of a radiologically demonstrated crater cannot prove that such a crater is absent. (The presence of a crater on the other hand, is good evidence that the ulcer has not healed.) That a duodenal ulcer has healed must therefore often be presumed from the only available evidence—namely, persistent absence of symptoms. Admittedly this is not a wholly satisfactory criterion since large ulcers may sometimes be unaccompanied by symptoms.

As to how long after the presumed healing of the ulcer the patient should continue with his regular alkali it is extremely difficult to say. It can be convincingly argued that if he is advised to continue at all he should be advised to do so indefinitely, since the reason for continuance is the possibility of relapse which is as likely in the distant as in the immediate future. In practice, however, it is probably futile to give this advice for the excellent reason that the patient will almost certainly fail to carry it out. Most men forget their pain fairly quickly and as its memory grows dimmer, naturally return to their usual habits of living. Perhaps in general the best plan is to tell the patient what is the true state of affairs—that the tendency within him to develop peptic ulcers cannot be abolished, but that the more alkaline he keeps his stomach contents the less likely will he be to relapse—and leave the rest to him. In the event of the slightest return of symptoms, he should of course, be urged immediately to resume the intensive alkaline régime for a period. It may also be sound to suggest that the régime is adopted in times of mental stress.

In so far as peptic ulcer responds to this intensive alkaline treatment while the patient is taking a normal diet and going about his usual business it represents a fairly simple problem, and one which can be dealt with repeatedly in the same way when there is a relapse. The difficult situation arises when a patient goes on having severe symptoms in spite of this treatment or when relapses are very frequent.

As was previously noted many large and intractable ulcers can be healed by the continuous intragastric milk or alkali drip. Now there is no fundamental objection to the patient continuing in his ordinary activities and merely having the drip throughout the night—which presumably is the time when it is most valuable, since during the day a considerable measure of alkalinisation can be obtained by taking alkali frequently in the usual manner. But unfortunately no firm seems to have put on the market drip apparatus which is satisfactory for home use at night. Until such an apparatus is evolved for most people the drip means a spell of immobilisation in a hospital bed.

Although drip treatment can be expected to give profound symptomatic relief and may be followed by a considerable remission, I doubt whether it can give permanent or even long-continued relief to the significant proportion of people who are subject to severe peptic ulceration. Information on this point derived from large series of cases studied for many years are apparently not available, but it seems probable that patients with intractable ulceration are liable to develop similar ulceration again, even if the trouble has been temporarily healed by the drip Perhaps, therefore in practice the greatest value of the drip is in treating those victims of severe ulceration who refuse operation or have other ailments making operation inadvisable The drip may also possibly be of help as a preliminary to operation, by making this less difficult technically

Much conflicting advice has been variously given as to the indications for gastrectomy And no doubt many factors should be taken into account, such as the patient's age, build, temperament, and occupation, and the presence or absence of chronic bronchitis or other significant second condition Nevertheless, unless one of these factors provides a strong argument against gastrectomy, the reasonable criterion for this operation seems to be that the patient *cannot be made well and kept well by frequent doses of alkali while living his normal life* There are, of course, weighty arguments for operation which are generally accepted—typically recurrent hæmatemeses and pyloric stenosis—but since those so affected do not remain well while living their normal lives, the criterion suggested covers these eventualities

THE ONUS OF PROOF

The " orthodox " medical management of peptic ulcer involves long, and often repeated, periods of rest in bed and longer spells of absence from work, an artificial and more or less unpleasant diet, often to be continued indefinitely, and the avoidance or restriction of tobacco and alcohol—all of which tend to give the patient the impression that he is an invalid Quite apart from the arguments advanced against this management in the present paper, it must be asked on whom must the onus of proof lie when the value of remedies are in doubt—on those who advocate them or on those opposed to them ?

Elsewhere (Todd 1951) I have pointed out that, whereas in respect of new drugs it is universally agreed that the onus of proof should rest on their advocates, the attitude widely adopted towards old and traditional remedies, and in particular régimes and diets, is to accept them as valuable until evidence is advanced that they are not I concluded that this difference of approach is unsound, and that the advocates of all remedies should produce evidence of their claims If such evidence is lacking, remedies should be abandoned, no matter how widely they are used, and no matter what pronouncements as to their value appear in textbooks (Admittedly in practice the doctor, especially if he is young and lacks prestige, can hardly be blamed for treading carefully the paths of unorthodoxy, but there is no reason why he should think on orthodox lines, even if discretion makes him act on them)

If these arguments are sound, the advocates of bed rest, staying away from work, dropping commitments, changing the habits of life, eradicating septic foci, omitting tobacco and alcohol, and eating artificial diets should be required to provide proof of their views, and until such proof is advanced it is sound practice not to prescribe these remedies for peptic ulcer Moreover, the treatment recommended in this paper—that large doses of alkali should be taken throughout the day—is so much simpler and pleasanter for the patient than taking frequent meals that the onus of proof should surely lie on the advocates of frequent meals, not on the advocates of frequent alkali

Probably only a minority of patients are advised to undergo the full rigours of orthodoxy, especially in the matter of staying in bed and being away from work (Those treated by general practitioners are, one may suppose, more fortunate in this respect than those treated by some of the specialists in gastro-enterology whose ce appears in textbooks and journals) No doubt, too, a high proportion of patients who are ordered the wh orthodox ritual ignore much of what they are told. I seems, indeed, that the ordinary instincts of the patien may sometimes give better results than the considere opinions of his medical advisers and that the understanding which the general practitioner has of h patients' problems may make his treatment better th that derived from the more theoretical calculations of th specialist

Summary and Conclusions

Of the various methods of treating peptic ulcer onl three are of proven value—diminishing the gastr acidity, gastrectomy, and psychotherapy (which has onl a very limited application)

As a routine for the medical management of pepti ulcer, it is suggested that the patient, while carryin on with his work, should take alkaline tablets at hourl intervals throughout his waking hours (except at th usual meal-times, when he has his ordinary foo instead) He should continue to do this until his ulce is thought to be healed, and thereafter he should b told that the more closely he adheres to this régime, th less will be the chances of relapse

The view is advanced that the onus of proving th value of rest in bed, absence from work, an artificial an monotonous diet, phenobarbitone, the eradication septic foci, the avoidance of tobacco and alcohol, and th other orthodox remedies, should rest on their advocate not on those who are opposed to them

This paper is an elaboration of ideas which I have previous expressed elsewhere (Todd 1949) I wish to thank Dr Jam Dow for his advice and criticism, and my father for h valuable help in revision.

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INTRA-OCULAR ACRYLIC LENSES AFTE CATARACT EXTRACTION*

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No surgical operation surpasses modern catara extraction in doing what it is designed to do, for th defective part is removed under local anæsthesia in single stage through an incision which heals with a invisible scar But the lens, an important part of a highl specialised organ, is lost and cure is complete only whe another lens is substituted. Extraction alone is but hal the cure for cataract

CATARACT OPERATIONS

Operations for cataract have been practised for 300 years " Couching," or surgical dislocation of the opaqu lens into the vitreous chamber, was in early times the onl possible measure, but the proportion of successful result must have been small Even in the present century th operation, or modifications of it, was used in India in other countries where the people are backward and surgeons few and where only surgery which is quick is relatively safe from sepsis, and does not necessitate postoperative convalescence, is practicable.

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* A fuller account of this work will appear in the *Britis Journal of Ophthalmology*

In 1748 Daviel described the first cataract extraction but as is often the case, his operation though an evident improvement, was not at first well received, and couching continued to be the method of choice Apart from the risk of sepsis the absence of anæsthesia must have made Daviel's operation difficult and dangerous, and one cannot but admire his courage in performing it. Little improvement took place until the last quarter of the 19th century when cocaine was introduced as a local anæsthetic, rendering the operation not only painless but also less hazardous. Since then the results of cataract surgery have become increasingly successful

Extracapsular Extraction

At first extracapsular extraction seemed the only possible method and with its many modifications and improvements it is still widely used today After a corneo scleral section the anterior capsule is incised and the opaque lens expressed through the pupil and out of the eye. For many years surgeons would not operate until the cataract was mature, when the entire cortex could be extracted in one piece. This however, entailed the patient waiting perhaps years in almost complete blindness for if the operation were performed too soon, only the nucleus would be expressed The remaining cortex might block the pupil set up anaphylactic iridocyclitis, and possibly prevent proper healing of the wound leading to further complications, including even sympathetic ophthalmia.

Two major improvements have since been made better asepsis has rendered possible the removal of residual cortex with a jet of sterile saline solution and removal of a large central area of the anterior capsule with toothed capsule forceps has made a clear pupil probable It is found that, if only the thin posterior lens capsule is left, needling of ' after cataract ' is seldom required In suitable cases the modern extracapsular extraction gives excellent results and the posterior capsule remains as a useful bulkhead in the eye keeping the vitreous in place and reducing the risk of aphakic glaucoma and retinal detachment

Intracapsular Extraction

Early in the 20th century intracapsular extraction was introduced In this operation the intact anterior capsule is grasped with non toothed forceps and by a combination of traction from in front with pressure from behind the entire lens enclosed in its membrane is removed This improvement which permits extraction of quite immature cataracts as soon as the patient can no longer read was at first considered unjustifiably dangerous and has only in recent years become more popular than the well tried and generally successful extracapsular extraction There is no doubt that in the hands of inexperienced operators the risk is considerably greater but with perfected technique the acme of cataract extraction has been attained

Now since 1949 200 years after Daviel's first extraction it has proved possible successfully to substitute for the missing lens an artificial intra-ocular lenticulus.

APHAKIA

An eye which has undergone cataract extraction suffers many disadvantages. Accommodation is inevitably lost but this is of small practical importance since the loss is physiological in most persons of cataract age The eye is completely out of focus without a spectacle lens of about +11 D and when washing or bathing, the patient is almost blind Cataract glasses are cumbersome, disfiguring and heavy and what is more important function only at their best when the view is through the optical centre. Oblique views produce aberration and apparent displacement of objects which make patients feel uncertain of the position of steps and other obstacles and give rise to lack of confidence in traffic. For these reasons though 6/6 vision is often attained the sight is not so good as this high acuity suggests If the other eye is normal or has even moderate vision the two eyes when focused are incompatible, for in addition to producing aberrations the aphakic spectacle lens magnifies the retinal image by a third A contact lens would considerably reduce these disabilities but the image of the aphakic eye would still be magnified by a sixth Moreover most cataract patients cannot insert contact lenses or do not persevere with them because of the irritation they cause Surgeons are often loth to remove even a mature cataract if the other eye has moderate sight for patients often prefer to continue using the eye which has not undergone operation and has an acuity as low as 6/24 rather than the aphakic eye which can read perhaps 6/6 The new technique of inserting an artificial intra-ocular lens is particularly indicated in monocular cataract or when the other eye still has fair sight for patients generally have no difficulty in coördinating the two eyes and appreciate binocular vision from the start.

ARTIFICIAL LENTICULI

All the disadvantages of aphakia except lack of accommodation can be overcome by the use of an intra ocular lens Human lens grafts are impracticable, certainly at present and an artificial prosthesis is the only solution The problem to be solved is threefold (1) to select a suitable transparent material which will not produce a tissue reaction in the eye (2) to determine the size and refractive power of the lens and (3) to devise a method of inserting it and retaining it steadily in position within the eye

The only materials available at present which are suitable for such a lens are glass and plastic poly methyl methacrylate compounds generally known as 'Perspex' or Plexiglass.' Both are inert in the body Fragments of glass have remained in eyes for years often overlooked even with careful examination and cause no trouble unless a sharp edge lies against a sensitive and mobile portion such as the iris Rather less is known about methacrylate, but some knowledge has been gained from eye injuries caused by aircraft accidents. Methacrylate spheres can be used to fill up Tenon's capsule after enucleation of an eye and have been extensively used in orthopædic surgery not only for filling gaps in flat bones but also to take the place of the head of the femur In joint cavities movement and the presence of synovial fluid provide some resemblance to conditions within the eye

Physically glass and perspex are similar in their almost perfect transparency and in their constant optical properties and ease of working Perspex is the softer and therefore more easily scratched but it has the overwhelming advantage of light weight its specific gravity being 1·19 only half that of glass and little exceeding that of the aqueous For this reason methacrylate was preferred.

On inquiry the manufacturers of perspex (Imperial Chemical Industries) advised their product Transpex I as the variety of polymethyl methacrylate best suited to the purpose, because its composition and optical properties are constant and being unpolymerised it avoids the risk of gradual liberation of free polymeriser which might cause chemical irritation The refractive index is 1·49 and the specific gravity 1·19 It cannot be boiled without risk of distortion and it is affected by certain organic solvents, including alcohols For cleansing and sterilisation it is recommended that 1% cetrimide be used for at least half an hour Other sterilising fluids are under experiment but clinically cetrimide has proved satisfactory

The design of the artificial lens to replace the natural is not the simple problem it might appear. The human lens is a complex structure composed of differing layers of anterior and posterior capsule, cortex, and nucleus, and therefore has no constant refractive index. It is thought that, when the lens is in the eye and unaccommodated, its diameter is about 9·4 mm., its thickness 4 mm., the radius of the anterior curve 10 mm., and the radius of the posterior curve 6 mm. The refractive index is approximately 1·42, and the refractive power is variously estimated between 16·01 D and 19·11 D in the aqueous fluid.

In designing the intra ocular lenticuli it was decided to make them about 1 mm. less in diameter than the natural, for ease of insertion and to obviate pressure on the ciliary region and filtration angle, which might tend to produce cyclitis and glaucoma. The earliest lenses were made 8·35 mm. in diameter and with curvatures of the radii attributed to the natural lens. But in the human eye it was found, as it could be in no other way, that such a lens was too strong. Calculating from the refraction resulting from this prototype within an otherwise normal eye the present lens specification was evolved.

Material	Transpex I
Diameter	8·35 mm.
Thickness	2·40 mm
Radius of anterior curve	17·8 mm
Radius of posterior curve	10·7 mm
Refractive power in aqueous (1·33 refractive index)	24·0 D

A peripheral groove is cut in both sides of the lens before polishing so that it may be grasped in forceps. The lenses are individually worked from solid transpex I and finished to fine limits of accuracy by Messrs. Rayner, London.

It is evident that this lenticulus is not a copy of the human lens and that its refractive surfaces cannot occupy the same positions. The compound system produced by this and the ocular media, however, closely and consistently reproduces the normal, judged by the refraction of the other eye. Up to now the object has always been to render the two eyes refractively similar and capable of working together again; in future, if the pre cataract refraction is accurately known and it is intended to insert acrylic lenses in both eyes, it may be desirable to produce lenses to individual specification to attain postoperative emmetropia.

OPERATION

The acrylic lenticulus may be inserted immediately after extraction of the cataract or at a second operation some time later. The two stage operation is recommended only when the cataract has been caused by a perforating wound, or when it has proved impossible at the extraction to remove all lens matter and time has to be allowed for absorption of cortical remnants. In two-stage operations difficulty may be experienced in freeing the iris from the lens capsule, for synechiæ may be found not only at the pupillary margin of the iris. Before operation the acrylic lens, and a spare, should be placed in a special rack (Rayner) correctly oriented so that it can be readily grasped in forceps with the flatter surface forwards. The difference in the curvatures can be seen fairly easily in profile, but a valuable check is to observe the two reflections of a source of light from the anterior and posterior lens surfaces. When these are markedly dissimilar the flatter anterior surface is in front. If the lens were inserted back to front, the resulting refraction of the eye would be greatly affected. The rack containing the lenses is sterilised in 1% cetrimide, thoroughly rinsed in sterile water, and placed with the cataract instruments, which include in addition special lens insertion forceps and an iris hook (Messrs. Weiss, London).

Extracapsular extraction is recommended, but the intracapsular has been used on two occasions. The pupil should be dilated to at least 5 mm. in diameter with homatropine. Anæsthesia is provided by 4% cocaine drops, no retrobulbar injection being required. A pro injection is given over the neck of the mandible to orbicularis spasm, and a simple stitch is inserted the upper lid so that it can be strapped to the cheek ensure closure of the eye after operation. Two half thickness corneoscleral mattress sutures of the finest silk are inserted, and a normal cataract section is cut, including where possible a conjunctival flap. Very complete removal of the anterior lens capsule is effected with toothed capsule forceps, and after expression of the nucleus great care is taken to wash out all cortical remnants so that only the thin posterior capsule remains in the pupil. If these stages have proceeded satisfactorily, the lens may now be inserted; if not, the eye must be closed and the operation completed at a later date. The lens is grasped by its peripheral groove with the insertion forceps, the corneoscleral wound is held open with an iris repositor, and the acrylic lens is gently introduced with a slight side-to-side movement through the pupil so that it rests partly behind the iris below (fig. 1). The grip can now be relaxed, and, while the lens is steadied with a repositor, the iris above and laterally is manipulated over the lens with the hook (fig. 2). When the pupil has been made circular, a small peripheral iridectomy is done, and, after centring of the lens by external pressure on the cornea and sclera and a final irrigation, the sutures are tied. Penicillin is instilled, but miotics are not generally necessary or desirable. The patient is allowed out of bed on the third or fourth day, and the sutures are removed on the eighth day.

COMPLICATIONS

The operation is clearly more complex than simpl extraction. The key to success is to introduce the len beneath the lower part of the iris before the forceps grip is relaxed. If, however, the lenticulus is found t be entirely in the anterior chamber, it is advisable t grasp it again by the peripheral groove and to reinsert it for otherwise it is very difficult to hook the lower edge o the pupil over the lens. The iris hook has a pliable stem s that it may be bent to facilitate this manœuvre if necessary

With 2 exceptions, all the operations so far performed have proceeded satisfactorily. In the first, in which to large a lens was inserted and no corneoscleral suture were used, the patient developed an iris prolapse, but th eye by good fortune has healed satisfactorily and is now free from inflammation. In a later case, a rather feebl

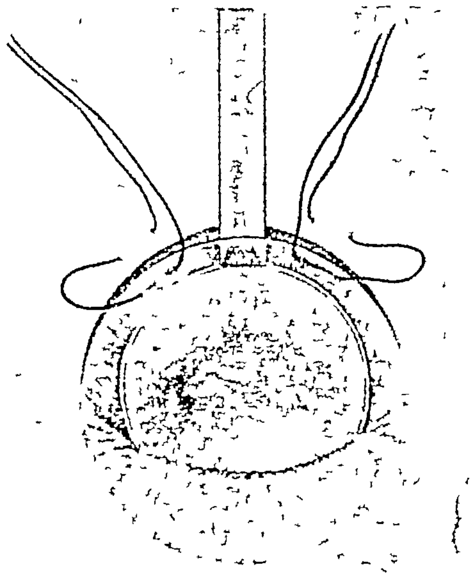

Fig. 1—Insertion of acrylic lens beneath lower part of iris.

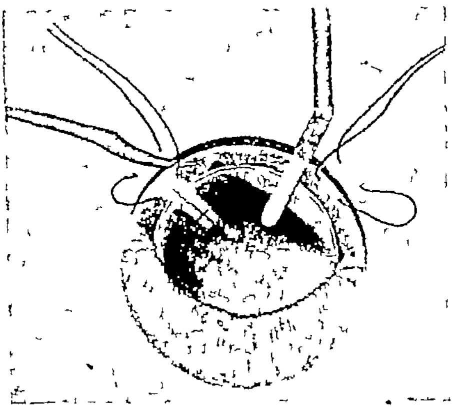

Fig. 2—Upper part of iris hooked in front of acrylic lens which is steadied by iris repositor

patient, aged 75, developed glaucoma because the corneoscleral wound did not unite in the usual time and when the sutures were removed the iris became adherent to the cornea, causing a false filtration angle and glaucoma Many, but not all, of the others have developed a transitory serous iritis but in no case has this persisted or recurred It has however led to the deposition of exudate and iris pigment granules on the anterior surface of the lens, which is sometimes slow to clear Subconjunctival injections of cortisone 10 mg are valuable in these cases which however seem to have a strong tendency to clear spontaneously Adhesions forming between the iris and the lens may assist in keeping the lens in position, though they are not essential.

Thickening of the posterior capsule is an evident possibility If this is feared a central capsulotomy could be performed before the lens is inserted, and in one early case it has been necessary later to incise the capsule from behind under direct observation through the pupil. In the other cases this operation which entails risk of damaging or dislocating the acrylic lens, has not been required It must be remembered that the posterior lens capsule unlike the anterior which has also an inner cellular layer, is a simple hyaline membrane of minute thickness, the central area measuring only 4 µ and that the presence of the acrylic lens tends to keep it taut and free from wrinkles.

There has been no case of dislocation of the prosthesis The lenticulus is held steadily in the patellar fossa by even pressure from the muscular iris in front against the natural curve of the posterior lens capsule behind Since the specific gravity of the lens is only slightly greater than that of the aqueous, there is little tendency for it to sink and the stability is shown by the constancy of the refraction for even a slight tilt of a powerful lens would cause marked astigmatism

The early operations were done only on patients with monocular cataracts, for those whose eye was completely normal had less to lose should complications ensue whereas success, in addition to other advantages would restore single binocular vision The risks were explained beforehand

RESULTS

Of the 25 eyes which have so far undergone this operation at St Thomas's Hospital and Moorfields, Westminster and Central Eye Hospital the first 2 are unsatisfactory for the experimental lenses inserted which were made with the same curvatures and thickness as the human lens, proved in practice to be too strong, producing postoperative myopia. In conjunction with the other eye the visual result is no better though little worse, than would have resulted from simple extraction.

Of the remaining 23 only 1 has given serious trouble as noted above the patient was an old man whose corneoscleral wound did not heal properly The other 22 cases are all successful in that binocularly the visual result is better than it would have been with simple extraction alone

A more stringent criterion, however is to judge each eye individually and not as one of a pair and to assess the performance of the organ rather than of the patient

These 22 eyes are surgically satisfactory having circular or nearly circular pupils, acrylic lenses in good position normal tension and no active iridocyclitis. In several there is a deposit of fibrinous exudate coloured by iris pigment on the front of the lens, but even in the worst cases this is gradually dispersing and there seems good prospect that all will clear in time and that every eye may obtain high acuity At present two eyes can see 6/36 letters, one 6/24 three 6/18 two 6/12, five 6/9 five 6/6 and two 6/5 One 6/36 eye is technically perfect with an intracapsular extraction but has myopic degeneration Two recent cases have not yet been tested for acuity All but three underwent the one-stage operation

The compound lens system resulting from the conjunction of the acrylic lens described and the ocular media must necessarily differ from the normal, since the lens is certainly not the same as the natural one in shape and thickness and may not occupy precisely the same position in the eye The effect, however is most satisfactory, the resulting refraction being generally within 2 dioptres of the pre-cataract refraction, judged by the other eye. Many patients see quite well without spectacles or with those they used before cataract developed. Astigmatism averages about 1 dioptre—rather less than with simple extractions Binocular vision is usually appreciated as soon as the eye is ready for use, and in some cases accurate sight is regained very early It is a new experience to hear a cataract patient remark at a postoperative dressing: "I can see the faces of all you gentlemen quite clearly"

DISCUSSION

The introduction of intra-ocular acrylic lenses is capable of producing an improved result in all types of case In monocular or nearly monocular cataract the advantages are overwhelming for by no other method is it possible to restore almost perfect binocular vision Convalescence is not prolonged and the dangers of operation seem comparable to those of simple cataract extraction Though the technique is still in its early stages, and improvements are being made continually the experience here recorded shows that a satisfactory lens can be inserted and retained in place without apparent harm to the eye In 1 case two years have elapsed since the lens was introduced.

SUMMARY

It is now possible to substitute for the opaque crystalline lens an artificial intra-ocular lenticulus capable of producing an excellent visual result

Such a lens can remain in an eye for at least two years without causing irritation

My sincere thanks are due to Mr J Pike of Messrs. Rayners 100 New Bond Street London, W 1 for constructing and perfecting the intra-ocular lenses and designing the lens rack; to Messrs John Weiss & Son, 287 Oxford Street W 1 for making the special lens forceps and iris hook; and to Imperial Chemical Industries for supplying suitable acrylic compounds. Miss J Trotman has kindly drawn the illustrations.

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THE EFFECT OF ADRENAL EXTRACT ON MINERAL METABOLISM

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A complete knowledge of the quantitative and qualitative nature of the secretion of the adrenal gland is of clinical interest, not only for increasing the efficacy of substitution therapy in hypo adrenalism, but also because such knowledge may throw light on the ætiology of the "diseases of adaptation" postulated by Selye (1950)

Though the chemical nature of the glucocorticoids and their rate of secretion by the adrenal glands under various conditions are fairly well understood, the corresponding properties of the mineralocorticoids are still unknown Many workers, in particular Wirz (1950, 1951) and Verzar (1950), have even suggested that the classification of corticosteroids into mineralocorticoids and glucocorticoids is artificial, because all cortical hormones have an action on both mineral and carbohydrate metabolism, their only physiological differentiation being one of duration of action They base their theory on their findings that there is qualitative similarity in the action of cortisone acetate and deoxycortone acetate if the time interval of the investigation is suitably chosen

Understanding of the properties of the glucocorticoids has mainly resulted from the application of an appropriate method of microbio assay (Venning 1950, Vogt 1943, 1944, and others) A comparable method of microbio assay of the effect of steroids on mineral metabolism has not been available, and as Selye says "The study of the diseases of adaptation has been handicapped principally due to the difficulty of assaying blood and urine specifically for mineralocorticoid activity" We present here in outline such a method and in particular its application to the investigation of the mineral activity of adrenal extract and its constituent compounds

METHOD OF BIO-ASSAY

The bio assay was based on the effect of corticosteroids on the urinary Na^{24}/K^{42} ratio in adrenalectomised rats in a two hour interval after the injection of the radioactive isotopes The animals used were male Wistar rats aged 3 or 4 weeks and weighing 35–45 g Bilateral adrenalectomy was done by the dorsal route under ether anæsthesia After operation the rats were fed with the stock diet of rat cubes, but a solution of 1% sodium chloride and 5% glucose was substituted for their drinking water The assay was made four days after the operation, during which time temperature and humidity were kept constant The presence of any residual cortical tissue was checked by observing the survival time following the withdrawal of saline solution after the assay

At 11 A M on the day of the assay the rats were injected subcutaneously with a solution of the hormone in 0 1 ml. of 20% alcohol, and controls were injected with the aqueous alcohol alone This was followed an hour later by a subcutaneous injection of 0 5 ml of an aqueous solution of sodium and potassium chloride labelled with Na^{24} and K^{42} This solution contained 54 µg of sodium per ml and 760 µg of potassium per ml and a total radioactivity on the day of the assay of about 20 µC per ml After injection each rat was placed in a 500 ml beaker fitted with a wire mesh At the end of the two hour collection period the rats were made to urinate by applying slight suprapubic pressure The beakers were then rinsed and the contents poured into [illegible] dishes and evaporated to dryness The dishes were [illegible] under an end window Geiger counter, and by an absorption technique the $\frac{\text{counts per minute due to Na}^{24}}{\text{counts per minute due to K}^{42}}$ was determined for each sample, and for an aliquot of the injected solution. The ratios for the samples were expressed as fractions of the latter value

It was found that the lowering of the Na^{24}/K^{42} ratio was linearly dependent on the logarithm of the dose of deoxycortone acetate for a range of 0 8–4 0 µg The slopes of the ratios against logarithm of dose for adrenal cortical extract and the active cortical steroids were found to be linear and parallel with that of deoxycortone acetate Block variation from test to test necessitated the use of 6 point or 4-point balanced assays with deoxycortone acetate as the standard A standard curve, however, could be constructed for the rapid assay of substances by expressing the Na^{24}/K^{42} ratio for the compounds tested as a percentage of the concurrent control values Block variation was found to be eliminated by this procedure The index of precision (mean error square/slope) for the balanced assays was about 0 28 The total time required to carry out the assay, including measurements, was about six hours Further details of the techniques, statistical characterisation of the method, and a more adequate bibliography will be published elsewhere (Simpson and Tait 1952)

TABLE I*—POTENCY OF ADRENAL STEROIDS AND EXTRACT IN TERMS OF DEOXYCORTONE ACETATE (100) MEASURED BY LOWERING OF NA^{24}/K^{42} RATIO IN URINE

Compound	Activity per unit mass	Exact fiducial limits P 0 05
11-deoxycortone	135	93–209
11 deoxycortone acetate	100	
Kendall's B (corticosterone)	14 3	9 1–21 1
Reichstein's 17 hydroxy-11-deoxycortone acetate	7 99	5 1–11·0
Kendall's F (17-hydroxycorticosterone)	7 58	3 3–14 9
Kendall's A (11 dehydrocorticosterone acetate)	6 74	2 5–10 9
Kendall's F (17 hydroxy 11-dehydrocorticosterone)	5 91	3 78–7 85
Kendall's E (17 hydroxy 11 dehydrocorticosterone acetate)	5 16	3 1–7 7
Progesterone	<3	
Œstradiol	<3	
Testosterone	<1 5	
Adrenal extract (beef)	40	20–50

In 6 point balance assays 0 83 1 25, 1 88 deoxycortone acetate were used and three doses of steroid of about corresponding activity

ACTIVITY OF STEROIDS AND ADRENAL EXTRACT

Table I shows the potencies per unit mass of various steroids in terms of deoxycortone acetate bio assayed by the method described above The action of all the active steroids was to depress the urinary Na^{24}/K^{42} ratios, and their activities compared with deoxycortone acetate approximately correspond with those obtained by other workers using the Kuizenga (1944) survival test and the Everse de Fremery muscle test (Reichstein and Shoppee 1945)

The specific activity of beef adrenal extract was high compared with most of the steroids Of the corticosteroids tested. only deoxycortone, deoxycortone acetate, and possibly corticosterone could account for the extract activity In view of this finding, an attempt was made to isolate the compound responsible for the mineral activity of the extract by using the paper chromatographic techniques developed for cortical steroids by Burton et al (1951)

TABLE II—MINERAL ACTIVITY OF FRACTIONS AFTER PAPER CHROMATOGRAPHY OF ADRENAL EXTRACT

Running time of chromatogram	Fraction	Location of steroids in fraction as indicated by standards *	Approximate percentage of mineral activity of A.C.E.
6 hours	Slowest	F E, B S? A	100
	Middle	*Deoxycortone*	0
	Fastest	Includes solvent front	0
1 day	Slowest	F E	100
	Middle	B	0
	Fastest	A	0
3 days	Slowest	F and certain unidentified compounds behind F	0
	Middle	E	100
	Fastest	S ?	0

* Steroids not actually found in the extract are in italics The presence of Reichstein's S was doubtful.

CHROMATOGRAPHIC INVESTIGATION OF ADRENAL EXTRACT

Adrenal extract was run against appropriate standards—e.g corticosterone, cortisone, deoxycortone—on Whatman's 542 filter paper with propylene glycol as the stationary phase and toluene as the mobile phase In addition to the methods of detection published by Burton et al. (1951) a more sensitive method first proposed by Haines and Drake (1950) was used depending on the strong absorption of ultraviolet radiation of wave length about 2500A by compounds possessing αβ unsaturated ketonic groupings, such as the active corticosteroids. As this technique allowed the elution and bio assay of compounds after their detection and localisation on the paper, it will be described in greater detail

After the steroids had been run for a suitable time depending on the resolution required the paper was dried and placed in intimate contact with the emulsion of an Ilford Q1 plate. The plate was irradiated through the paper by light of wave-length 2537A, which was isolated from the other emission lines of a quartz mercury-discharge tube by a quartz monochromator The areas of distribution of compounds with absorption maxima near this wave length were indicated on the plate with a sensitivity of about 1 μg per sq cm These absorption areas were traced through on to the chromatographic paper and used as reference positions for the elution of compounds The compounds were eluted with ethyl alcohol and, after suitable dilution bio-assayed for mineral activity by the previously described method

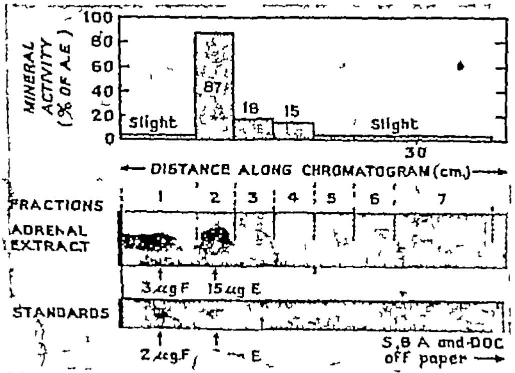
The chromatograms were run for about 6 hours, 24 hours and 72 hours, the resolution of steroids increasing with the duration of the running time Kendall's compounds E F B and A Reichstein's compound S, and deoxycortone were also run on the same paper for the location of these steroids in the extract It can be seen from table II that some of the standards ran off the paper for the longer running times

In preliminary work each sheet was divided into three approximately equal areas, which were eluted and the resulting solutions were tested for mineral activity The results are presented in table II As all the activity was present in the middle fraction of the three day chromatogram it was decided to investigate chromatograms run for such time intervals in greater detail For this purpose the chromatogram was divided into seven fractions as indicated in the accompanying figure This was repeated for two other runs but, as the speed of running of the steroids varied slightly the actual areas taken were increased or decreased proportionally the area from the origin to the back edge of cortisone being used as reference The elutions from the corresponding fractions were then pooled and bio assayed after suitable dilution. The results (see figure) show that some 87% of the activity lay with the ultraviolet absorption area of E and the remaining activity tailed towards the solvent front for a short distance.

These chromatographic investigations showed that the mineral activity of adrenal extract could only be explained by the following three alternatives, which will now be considered in turn

(1) *The Activity was Due Solely to Cortisone*—This explanation has already been shown to be highly improbable by the measurements of specific activities presented in table I However, it was further investigated by the following experiments. The total reducible steroid content of adrenal extract was determined and found to be equivalent to about 300 μg of E per ml This gave an upper limit to the concentration of E in the extract A more direct determination of E was made by running various amounts of adrenal cortical extract (A C E) against different quantities of E and their extinction of ultraviolet radiation (λ = 2537A) compared In th way it was estimated that 1 ml of adrenal extract contained 40–60 μg of cortisone The mineral activity of the fraction of A C.E coincident with cortisone was now compared with cortisone separately run and eluted *The fraction from 1 ml. of* A C E was much more active (1 ml of A C E equivalent in mineral activity to 2538 μg of F) than 300 μg of E when tested in a 4 point balanced assay at suitable dilutions. This quantity of E (300 μg) was equal to the upper limit of cortisone as given by the reducible steroid method and was about six times greater than the amount of cortisone in 1 ml of A C.E measured by the ultraviolet absorption method These experiments showed that the activity could not be due to E alone

(2) *The Activity was Due to Synergistic Action Between F and an Unknown Compound or Compounds*—The following critical experiments to test this hypothesis were made A solution was made of 300 μg of E in 1 ml of A C.E The mineral activity of this solution was compared with A C E alone at suitable dilutions in a 4 point balanced assay The same was done for fraction II of the three-day chromatogram (see figure) and cortisone Fraction II was that coincident with F on the paper chromatogram In neither experiment was any synergistic action detected



Mineral activity of seven fractio[illegible] chromatogram of adrenal cortical extract. The fact that the to[illegible] of the fractions was 120% of the original A.C.E. is not considered [illegible]cant.

These experiments showed that the activity was not due to any activation of E by an unknown compound

(3) *The Activity was Due to an Unknown Compound or Compounds* —From the preceding experiments it could only be concluded that the mineral activity of A C E was due to some compound other than the known crystalline cortical steroids—i.e , F, E, S, B, A, and deoxycortone—and that this compound and cortisone had similar running properties in this particular two solvent system of propylene glycol and toluene

CONCLUSION

The mineral activity in adrenal extract is due to a highly active compound or compounds which is not one, or a combination, of the known crystalline cortical steroids The relation of this compound or compounds to Kendall's (1940) amorphous fraction or to Hartman's sodium retaining fraction (Thatcher and Hartman 1946) remains to be shown

The steroids used by Selye—i e , deoxycortone acetate and Reichstein's S—to produce experimental arthritic lesions in laboratory animals do not significantly contribute to the mineral activity of A C E , although their action may be similar to that of the active compound (Selye 1946)

Cortisone isolated from adrenal extracts and perfusions by Zaffaroni's method (Burton et al 1951) of paper chromatography is likely to have an anomalously high mineral activity This will not apply to the perfusate unless the active mineralocorticoid is secreted by the gland

We consider that a combination of the microbio assay and the paper chromatographic methods of isolation is suitable for the investigation of small amounts of other biological materials, such as blood-plasma, for mineralocorticoid activity We propose to extend these investigations to include such materials

We are grateful to Allen & Hanbury's Ltd for gifts of their adrenal extract ' Eucortone ' and to Professor Reichstein, Messrs. Ciba, and the Medical Research Council for gifts of adrenal steroids We are indebted to J Tierney, M. Woodford, and S Graves for valuable technical assistance Finally, we want to thank Prof E C Dodds and Prof J E Roberts for their encouragement and support throughout the work.

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" I do not think there is any question but that there is perversion of the truth in the majority of our scientific publications I mean that we have presented to the public and to each other only the logical rearrangement of our research work Research is not always logical It has a logical end , it always has, but its essence is the creative part The creative is editorially censored, and we are forced to rearrange what we actually do in the laboratory and put it into a logical sequence If science is presented as a procedure of purest logic there will be a tendency on the part of nonscientific administrators to feel that science, being logical, can be managed , that it can be controlled , that it can be ordered "
—Dr FRANK FREMONT SMITH, *Problems of Aging* (Transactions of the thirteenth conference), Josiah Macy, Jr , tion, New York.

THE IMBIBITION OF FLUID AS A CAUSE OF HERNIATION OF THE NUCLEUS PULPOSUS*

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IT is customary to suppose that the protrusion of intervertebral disc is the result of external mechani factors acting on the spine It is generally believed th the nucleus pulposus is extruded through the annu by the direct action of these external forces, and pre existing weakness in the annulus fibrosus is oft postulated to determine the site of protrusion To ma this mechanical explanation more acceptable it has b suggested that the disc which herniates under th conditions is not normal, and that a force which co not harm a normal disc might affect a " degeneratin disc in this way But this explanation is not entir satisfactory, because the process of " degeneratio seems to be mainly one of dehydration, in which nucleus pulposus shrinks and becomes fibrotic, and t is not the physical state of a disc which would predisp to protrusion Similarly the age for established degene tion as the cause of lumbago and sciatica is wro because lumbago and sciatica has its highest incide between 30 and 40 years of age, when degeneration is o starting, whereas in later years, when degeneration universal, attacks of lumbago are less common

The object of this paper is to bring forward evide that the protrusion of a nucleus pulposus might res *from intrinsic causes in the disc, and that in cert* circumstances the nucleus may swell and extrude its spontaneously, with extrinsic mechanical causes of o secondary importance

CLINICAL EVIDENCE

A history of recurrent attacks of lumbago preced the first attack of sciatica is so common as to make reasonable to conclude that sciatica, when due to d protrusion, is a *later stage of the same process* whi causes lumbago Here I wish to concentrate mainly the ætiology of acute lumbago, and for this purpose t type of case to be considered is the violent fulminat attack of lumbago which completely disables the patie for two or three weeks—i e , not the chronic type " low-back pain "

There are several features in the *clinical study of lumbago sciatica syndrome* which make it difficult postulate an external mechanical cause for lumbago

(1) Though the acute lumbago syndrome can foll sudden severe strains in lifting heavy weights, more oft it starts without recognisable injury or, if any injury encountered, this injury is usually trivial.

(2) The lumbago sciatica syndrome often follows expos to wet and cold, and a latent interval is usual between t exposure and the start of the symptoms

(3) The *duration* and the *quality* of the pain of acute lumba are quite unlike those of the pain which follows a severe inju to the spine After a severe injury, such as a fracture of t spine, the patient rapidly becomes comfortable after injection of a sedative, *provided that he is immobilised* in b A case of lumbago, on the other hand, exhibits a continuo pain, commonly of almost unbearable intensity, and the patie often does not appreciate immobilisation Sometimes plaster jacket in an acute attack of lumbago is intolerab and the patient *feels better if he is allowed to move sligh* in a vain endeavour to relieve himself Often sedatives ha to be administered for long periods, and only after one two weeks does the pain eventually subside

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* A paper delivered at the Fifth International Congress Orthopædic Surgery and Traumatology at Stockhol on May 19, 1951

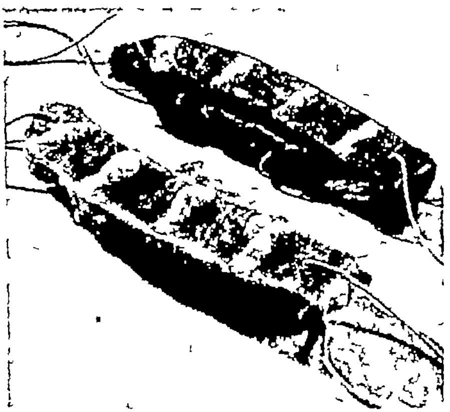

Fig. 1—Fresh lumbar spine taken from human cadaver frozen in carbon dioxide and sawn in half longitudinally; lower half after immersion in physiological saline solution for twenty-four hours; upper half control after thawing showing very little protrusion compared with lower half

The *persistence* of this acute pain is quite unlike the pain which follows injury for here the pain is maximal immediately after the injury and thereafter subsides and is only again elicited when the patient is disturbed. This continuous pain in lumbago is much more like what we see in inflammation in a confined space (e.g. osteomyelitis) or in conditions where there is high pressure in a hollow viscus (e.g., colics). We know that the process is not a bacterial inflammation and therefore the most likely explanation seems to be an episode of raised pressure in the disc.

(4) Severe injuries of the spine only very rarely cause immediate *sciatica*. A severe injury to the spine is much more likely to cause a fracture of the spine than a disc protrusion. *When a severe injury causes an immediate disc* protrusion the protrusion is usually massive and produces complete paraplegia. When sciatica follows a severe injury it usually follows after a latent period of weeks, or even months. It is this *delay* between the incident precipitating the lumbago or the sciatica and the start of the pain that indicates some obscure process going on inside the disc before the start of the acute symptoms.

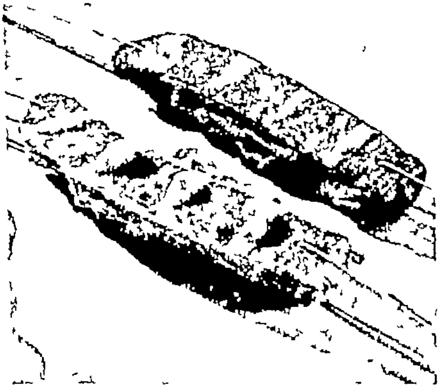

Fig 2—Same specimens as in fig 1 but with same amount of longitudinal traction applied to both. Note disappearance of protrusion in control.

(5) A careful analysis of the history will often reveal that before a sudden violent attack of sciatica there has been a prodromal phase during which the back has not been completely normal. This prodromal phase is often so slight that it would not arouse any special comment and, when the violent attack of lumbago develops most patients naturally tend to forget the slight disability present immediately before it.

A typical example of this was encountered in a doctor who one day lifted a small weight and thereafter felt a slight discomfort in his back. This discomfort persisted for twenty four hours but did not prevent him from carrying out his normal duties. Next morning the slight discomfort was still present when he got up but in the bathroom while shaving he was suddenly stricken with fulminating acute lumbago. The pain was so intense that he was shocked and had to be carried to bed. Thereafter the pain lasted unabated for two weeks. This prodromal phase is a very suggestive piece of clinical evidence which might imply that the disc is gradually becoming turgid and in the acute attack which follows culminates in some form of rupture.

EXPERIMENTAL EVIDENCE

The first experimental observation which tends to support the idea that acute lumbago may be caused by a rise of pressure in the disc was made during an inspection of intervertebral discs in the cadaver.

Fig 1 shows a fresh lumbar spine taken from a patient aged 24. The spine has been sawn down the middle after being frozen in carbon dioxide. The upper specimen is the control and is one half of the specimen after thawing out. The lower specimen is the other half of the spine after it has been immersed in physiological saline solution for twenty four hours. In the half which has been immersed in saline solution the central portions of the nuclei pulposi are seen to have imbibed fluid and to have swelled out much more than the projections of the nuclei in the control half. The projection of the nuclei pulposi as seen in the control specimen is a well known phenomenon but it is important to realise that this projection is produced by the elastic contraction of the annulus fibrosus and is not due to an increase in volume of the nucleus. This can be proved by putting tension on the spine in a longitudinal axis with traction cords as in fig 2, where the same amount of traction has been applied to both specimens. In the control specimen the projections of the nuclei are withdrawn completely into the normal disc space leaving a flat surface whereas in the specimen soaked in isotonic saline solution for twenty four hours no amount of traction can cause the swollen disc to withdraw. It is important to emphasise that in the swollen specimen the amount of protrusion demonstrated is generated by only half of the disc; were the whole disc to be concerned the projection would be twice as great which gives some idea of the true magnitude of these changes.

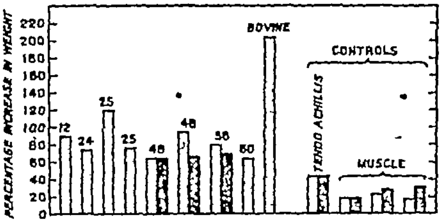

Fig 3—Imbibition of isotonic (stippled) and hypertonic (hatched) saline solution by intervertebral discs shown by increase of weight. The numerals indicate the patients ages.

To examine further this property of imbibing isotonic saline solution the amount of fluid which the disc can take up has been estimated by weighing before and after immersion in saline In fig 3 each of the vertical columns represents a cadaveric disc which has been weighed and then immersed in isotonic saline for twenty-four hours On being lifted out of the saline the disc is dried with cloth or blotting paper to remove superfluous fluid from the surface and is then reweighed. The increase of weight is expressed as a percentage of the initial weight Under these conditions the discs show an increase in weight varying on an average from 60 to 100% of their initial weight An extreme example is that of a bovine specimen which absorbed 200% of its original weight As controls, pieces of tendon and of muscle were examined in the same way by weighing before and after immersion for twenty-four hours in isotonic saline solution It was rather unexpected to find that these specimens also absorbed isotonic saline solution varying from 10 to 30% of their original weight The behaviour of the controls in this experiment is referred to below

To investigate this matter a little further, some of the discs were immersed in four times-hypertonic saline —i e , saline solution containing 3 6 g of sodium chloride per 100 ml One would have expected that in hypertonic saline both the discs and the controls would have shown some shrinkage in volume, but in fact this was not so The discs often took up almost as much hypertonic saline solution as they did physiological saline solution, and in some of the controls a greater amount of swelling took place in the hypertonic saline solution than in the normal saline solution This rather equivocal behaviour of the controls suggested that obscure post-mortem changes might be at work , this activity of the controls was not seen in the experiments of swelling against resistance (see below)

As this experiment showed that the nucleus pulposus could apparently take up more saline solution than other tissues could, it remained to discover whether the nucleus could *generate pressure* when taking up saline solution—i e , whether it could take up saline when resistance was opposed to its expansion This question was investigated with a plethysmograph (fig 4) in which the chamber of the instrument contained fluid and was closed off at the bottom with a thin rubber diaphragm , the fluid in the chamber communicated with a mercury manometer The nucleus pulposus under examination is held against the outer surface of the rubber diaphragm with a thin layer of metal gauze, which is then reinforced with a layer of stronger gauze, and finally a strong perforated lid is screwed to the body of the plethysmograph The apparatus is then immersed in isotonic saline so that the solution can reach the nucleus pulposus through the gauze The complete assembly of the instrument is seen in fig 5 If the nucleus pulposus can expand against resistance it must force the rubber diaphragm upwards, because the gauze prevents the nucleus from expanding downwards , if it can expand against resistance, a rise of pressure will be recorded by the manometer. Fig 6 shows some of the pressures which can be generated by the nucleus pulposus when exposed to isotonic saline solution for twenty-four or forty-eight hours Pressures of 150–250 mm Hg are often recorded The nucleus pulposus therefore can imbibe fluid against a resistance considerably higher than the normal arterial blood pressure The highest pressure recorded was in a bovine specimen which reached 310 mm Hg The age of the subject from whom the specimen was obtained was not necessarily related to the height of the pressure

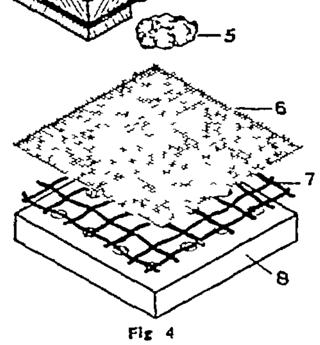

Fig 4

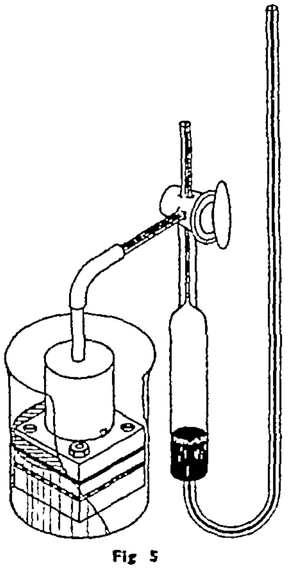

Fig 5

Fig 4—Plethysmograph : 1, outlet to mercury manometer , 2, chamber ; 3 fluid 4, thin rubber diaphragm 5 nucleus pulposus ; 6, thin metal gauze 7, strong metal gauze ; 8 perforated lid

Fig 5—Assembled plethysmograph connected with mercury manometer

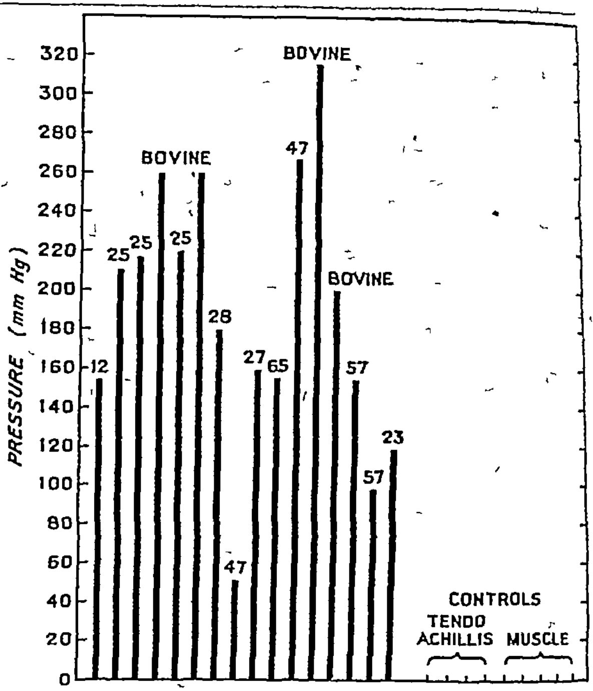

Fig 6—Pressures generated by swelling of nucleus pulposus by imbibition of isotonic saline solution The numerals indicate the patients' ages

The most remarkable thing about this experiment is the behaviour of the controls In the previous gravimetric experiments the controls immersed in saline solution absorbed 10–30% of their original weight, whereas the discs absorbed 60–100% In the pressure experiments, on the other hand, though the discs generated pressures of 150, 250, and 300 mm Hg, none of the controls developed any pressure whatsoever This difference appeared absolute and made it reasonable to suppose that the nucleus pulposus possesses a unique physical property when exposed to isotonic saline solution

The only other substance I have found which will swell against resistance in the same way as the nucleus pulposus is laminaria, the dry seaweed used by obstetricians to dilate the os uteri In this plethysmograph laminaria will generate pressures of 150–200 mm Hg when exposed to physiological saline

CONCLUSIONS

It has been generally accepted that the nucleus ulposus contains a chemical substance of the nature f a mucopolypeptide having hydrophilic properties t is now postulated that under certain conditions the disc may acquire an abnormal amount of fluid and thereby achieve an abnormally high internal pressure, and that his sudden attack of hypertension inside the disc may hen constitute an attack of acute lumbago The condi ions which could precipitate this episode of hypertension might be many and varied and, though unlikely, could even be infective as, for instance after exposure to wet and cold. Once the pressure has risen inside the disc, a spontaneous protrusion may start, and thereafter some slight injury may finally complete the bursting of the annulus the appearance of an external protrusion impinging on a nerve root will then convert the picture from one of lumbago to one of sciatica If this hypothesis should prove correct it opens up the future possibility of prophylactic treatment of lumbago by medical means.

My thanks are due to the members of the photographic department of the Manchester Royal Infirmary, for the illustrations.

NISIN IN EXPERIMENTAL TUBERCULOSIS

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EXPERIMENTS by Mattick and Hirsch (1947) and Hirsch and Mattick (1949) indicated that nisin the antibiotic produced by a strain of *Streptococcus lactis* might be of value in the treatment of tuberculosis and other infections of gram positive organisms. Accordingly the possibilities of its manufacture and uses have been examined further

Our experiments have not confirmed the early hopes. Substantial amounts of crystalline nisin have been made and although it has proved effective against many gram positive organisms including *Mycobacterium tuberculosis*, its activity on a weight basis is less than that of penicillin against gram positive organisms and less than that of streptomycin against the tubercle bacillus. Its activity appears to be reduced by serum and its effectiveness in vivo has been less than was anticipated from in vitro experiments The best nisin producing organism so far isolated produces only about a thirtieth of the quantity of therapeutic substance that is produced by producers of penicillin and streptomycin and this makes the cost of nisin appreciably higher than that of the other two antibiotics These results indicate that nisin is most unlikely to find a place in therapeutics

METHODS

The nisin was selected from crude and purified preparations made in collaboration by Bengers Ltd and Fisons Research Laboratories For injections solutions were made in $N/50$ hydrochloric acid and adjusted to pH 4 the formation of a fine haze being ignored Blood nisin levels were estimated by the resazurin and diffusion methods (Friedmann and Epstein 1951 Friedmann and Beach 1951) using crystalline nisin assumed 20×10^6 units per g as standard

IN VITRO ACTIVITY AGAINST TUBERCLE BACILLI AND OTHER GRAM POSITIVE ORGANISMS

Comparison of the activities of crystalline nisin penicillin and streptomycin against *Myco tuberculosis* and some other gram positive organisms gave the results shown in table I Sterile solutions (1 mg per ml.) of the antibiotics were prepared in a medium at pH 7·4 containing glucose 0·1% (*w/v*), peptone 1% (*w/v*), 'Casydrol' (enzymically hydrolysed casein) 1% (*w/v*) 'Yeastrel 0 1 % (*w/v*), sodium chloride 0 5% (*w/v*), horse serum 5% (*v/v*) and seven fivefold dilutions made in the same sterile medium Next 2 ml of each dilution was inoculated with three drops of a 1/100 dilution of the appropriate culture which had previously been grown for twenty four hours in the medium *Myco tuberculosis* was grown in a modified Dubos medium with 5% (*v/v*) horse serum Control experiments without the antibiotic were made and all tubes were examined after 24 and 48 hours incubation

TABLE I—BACTERIAL SPECTRUM OF NISIN WITH PENICILLIN AND STREPTOMYCIN AS CONTROLS ALL IN PRESENCE OF SERUM

Organism	Minimal inhibitory dilution (µg per ml)		
	Nisin	Penicillin G	Streptomycin
B anthracis	40·0	0 30	40·0
Bact. pneumoniae	8·0	0 30	200·0
Cl tetani	40·0	0 06	1000·0
Cl. welchii	40·0	0·06	1000·0
Corynebact diphtheriae	40·0	0·00	8 0
Corynebact. pyogenes	1 5	0 30	1 5
E rhusiopathiae	1 5	0·06	40·0
Myco tuberculosis	1 5		1 5
Staph aureus	8·0	0 06	40·0
Strep agalactiae	1 5	0·03	40·0
Strep pyogenes	40·0	8·00	200·0
Strep viridans	40 0	0 30	200·0

It will be seen from the table that, under the conditions of the experiments, nisin compares favourably with streptomycin in its in vitro action against *Myco tuberculosis* but is inferior to penicillin against most of the other gram positive organisms

TREATMENT OF TUBERCULOSIS IN MICE

Two methods of assessment were used the procedure outlined by Bavin (1949) and the corneal method described by Rees and Robson (1950)

Survival Method—Ten mice were used per dose per experiment, with ten mice as controls in each case, and the results are summarised in table II Only in experiment 24 in one of the five groups of intraperitoneally treated animals, was there any significant increase in the survival time

Corneal Method—Eighteen mice were infected by corneal inoculation and intraperitoneal injections were started in ten mice the same morning 50 000 units was given per day in equally divided doses each in 0 2 ml., morning and afternoon for eighteen days when it became obvious that nisin had not afforded any protection.

IN VIVO/IN VITRO TESTS

To explore the possibilities of nisin further and to assess its efficacy against tuberculosis under the most favourable experimental conditions, a Brownlee (1948) test was made on nisin in comparison with *p* amino salicylic acid (P.A.S) and streptomycin

Guineapigs were injected with doses near the LD50 and anesthetised with chloroform at signs of serious distress or up to 2 hours after the first injection. Blood was then drawn from the still beating heart with a sterile syringe and part of it was reserved for drug assays With a modified Dubos agar medium serial dilutions were prepared from the remainder and inoculated with *Myco tuberculosis* H37RV after sloping and setting Lungs spleen and liver were homogenised with $N/20$ hydrochloric acid (Hirsch and Mattick 1949) and the supernatant liquors assayed

According to Hirsch and Mattick (1949) much higher blood nisin levels can be obtained by the intravenous route than by the subcutaneous or the intramuscular route Nevertheless we used three different routes —intraperitoneal subcutaneous and intravenous—in the

TABLE II—EFFECT OF NISIN ON MEAN SURVIVAL TIME OF MICE INFECTED WITH VIRULENT HUMAN STRAIN OF *Myco tuberculosis* (CN 844, WELLCOME COLLECTION)

Nisin				Mean survival time (days)			
Experiment	Route	Dose	Activity of preparation used (units $\times 10^{-6}$ per g)	Nisin	Controls	P A S	Streptomycin
23 A, B, C, and D	Oral	0 03–0 13 % in food (4 levels)	20	23–28	25		
23 E	Oral	0 03 %	3	27	25		
24	Intraperitoneal	1500 units per day per mouse	3	33	27		
41	Intraperitoneal	50,000 units per day per mouse	17	23 3	21	31 6	33 7
42	Intraperitoneal	50,000 units per day per mouse	17	21 7	24	25	26
45	Intraperitoneal	100,000 units per day per mouse	17	18 7	21 6	19 3	25 3
49	Intraperitoneal	50,000 units per day per mouse	17	22 1	27 1	30 6	33 0

guineapig However, with one exception and regardless of route, the blood of the nisin injected guineapigs allowed the organisms to grow at the same rate as did the blood of the uninjected controls, and the blood nisin levels were below 250 units per ml (see table II) within 25 minutes of an intravenous injection

Hirsch and Mattick (1949) have stated that minimum effective levels lie between 100 and 600 units per ml, and we are inclined to agree with the upper limit in guineapig blood, but the rapid fall in blood-nisin level to below the effective level is disturbing and is probably responsible for the poor therapeutic effect

Repeated injections of nisin (every 10–30 minutes) did not produce any appreciable increase in the blood-nisin or tissue nisin levels, nor were these bloods (table III, guineapigs 9 and 10, versus guineapigs 2 and 3) more effective against our strain There was, however, a pronounced influence on toxicities Symptoms of distress became more transient with repeated small injections, and very slowly injected doses (0 5 ml containing 20–50 mg given over 5 minutes) proved less toxic than those injected more quickly, although the number of animals was *too small for any definite conclusions* to be drawn According to Hirsch and Mattick (1949), the LD50 for rabbits lies between 20 and 30 mg per kg of body-weight for the intravenous route, which fact makes nisin 5–10 times as toxic as streptomycin

We were able to inject as much as 70 mg per kg of body weight without causing death In another guineapig 100 mg of crystalline nisin caused death, and a third guineapig survived when the same dose was given divided into three lots This would bring the toxicity of nisin more on a level with that of streptomycin. However, streptomycin did suppress growth of tubercle bacilli at this injection level (guineapigs 6 and 12) without killing the guineapig, while nisin suppressed growth to a limited extent only in one single case (table III, guineapig 11) where the amount injected proved lethal. Although the thorax was opened almost immediately after the injection, the heart had already stopped beating Blood could nevertheless be withdrawn with ease and it contained 500 units of nisin per ml

It is interesting that the sibling (guineapig 10) which had received the same total dose, but whose blood was collected 25 minutes after the last injection, had a blood nisin level of only 50–100 units per ml, and the blood was incapable of suppressing growth of tubercle bacilli in vitro

Tissues contained at the most 50–70 units per g. *and no significant differences could be discovered betwee* the extracts of lungs and other tissues

EFFECT OF NISIN ON RESPIRATION, HEART, UTERU AND ILEUM

The effect of nisin on respiration (rabbit), isolate heart (rabbit), isolated uterus (guineapig), and isolate ileum (rabbit) was also investigated Doses up to 200,00 units had only a transient effect on the respiratory rat Doses of 20,000 units caused a sharp transient rise in th heart rate, followed by a fall from which the heart di not regain the pre nisin rate Smaller doses (down 2000 units) produced a rapid transient increase followe by a fall below the pre nisin level, with subsequer recovery

Doses of 2000 units were without effect on the uteru 4000 units caused delayed contraction, and doses 8000–64,000 units an immediate contraction Virgi and postpartum uteri showed no different respons Nisin in doses of 16,000–23,000 units was without effec on the ileum

DISCUSSION

Hirsch and Mattick concluded from their experiment in rabbits that nisin was a promising drug, but found

TABLE III—IN-VIVO/IN-VITRO ASSESSMENT OF NISIN IN COMPARISON WITH STREPTOMYCIN AND P.A.S

Guineapig no	Total amount injected (mg per kg of body weight)	Drug	Time interval from first injection to death	Time elapsed between last injection and death	Blood nisin level (units per ml)	Symptoms	Growth of *Myco tuberculos* in serial dilution tubes
1	23 I V	Nisin	8 min	8 min	Not tested	Shock like	+ + + +
2	90 (70 I V)	Nisin	2 hr (killed)	1 hr	250	Lying on side, cyanosed, but recovery	+ + + +
3	200 (20 I V)	Nisin	2 hr (killed)	1 hr	150	Not much distress	+ + + +
4	200 I V	Streptomycin	1–2 min.	1–2 min	4000	Streptomycin symptoms	− − − +
5	3700 I P	P A S	1 hr 40 min (killed)	1 hr 40 min	Not tested	Recovery	− − − +
6	200 I V	Streptomycin	2 hr (killed)	1 hr	125	Recovery	− − − +
7	None	Control					+ + + +
8	Saline solution only	Control	2 hr (killed)	2 hr (killed)			+ + + +
9	35 I V at 15 min intervals	Nisin	40 min (killed)	18 min (killed)	60	Little distress	+ + ± +
10	100 I V (3 injections at 10–14 min. intervals)	Nisin	1 hr (killed)	25 min (killed)	75	Some little distress but recovery	+ + + +
11	100 I V	Nisin	Almost immediately		500	Heart failure without definite symptoms	± ± + +
12	200 I V	Streptomycin	45 min. (killed)	45 min. (killed)	125	Little distress	− − − +

difficult to maintain a blood nisin level high enough to be effective in tuberculosis This level for a human strain of *Myco tuberculosis* was given as 100-600 units per ml in Long's medium and it was assumed that the activity of nisin would remain unaltered in the presence of serum In our experience, however the presence of serum reduces the effectiveness of nisin and experiments seem to indicate a minimum effective level of 500 units or 0 025 mg per ml. By whatever route nisin is administered it rapidly disappears from the blood and the possibility of maintaining a blood nisin level of 500 units per ml for any appreciable time seems remote

From in vitro solubility determinations Hirsch and Mattick reported that the 'maximal permitted concentration in serum is 5000 units per ml but this must not be interpreted as meaning non toxicity up to this level because very much lower concentrations are lethal

All our mouse experiments are negative This may be due to the method of administration (oral and intraperitoneal) or to a species difference or to our using a nisin different from that used by Hirsch and Mattick However intraperitoneally injected nisin prevented death in mice infected with *Strep pyogenes* or with *Staph. aureus* at roughly the same level, weight for weight as penicillin, which is in agreement with Mattick and Hirsch's (1947) findings. The inefficacy of nisin seems related to the fact that very high levels are necessary for the suppression of infections by a virulent human strain of tubercle bacillus

Our experiments also show that intravenously injected nisin is apparently inactivated in less than 25 minutes, which is a shorter period than has been suspected hitherto Although nisin has in our hands proved less toxic than reported by Hirsch and Mattick it has also proved less effective against a virulent human strain than in their preliminary experiments in rabbits.

In the case of the group of rabbits reported by Hirsch and Mattick (1949) as macroscopically cured' of tuberculosis after nisin treatment the rabbits were infected with a bovine strain This and not the intravenous route may have been the cause of the better result obtained in comparison with animals infected by a human strain and treated by other routes

The possibility that the nisin we have used might differ structurally and therefore biologically from that used by Hirsch and Mattick has been considered and nisin preparations of various degrees of purity derived from several strains of *Strep lactis* (group N) grown in two or more media have been examined by differential assay against *Strep agalactiae* and *Strep cremoris* and by paper chromatography but no significant differences have been observed in the intact materials

All the preparations have also contained the same amino acids but, as there are at least nine component amino acids in the molecule the possible forms of combination are very numerous and the possibility of a different nisin cannot be ruled out counter current distribution studies of a crystalline preparation (solvent system methanol 0·2M acetate buffer of pH 4 0 and *n* butanol in the proportions of 2 13 5 up to 50 transfers) showed clear separation into two active peaks. However the general economic considerations of manufacture in comparison with those of penicillin and streptomycin, and the activities of these two drugs in comparison with that of nisin make it improbable that nisin will gain a place in the treatment of human tuberculosis or infections due to other gram positive organisms

SUMMARY

The in vitro activity of crystalline nisin penicillin and streptomycin were compared Nisin was less effective than penicillin against the gram positive organisms used but against *Myco tuberculosis* its action was about equivalent to that of streptomycin

The effect of nisin on the course of tuberculosis in mice was compared with that of streptomycin and P.A.S Intraperitoneal and oral nisin proved useless.

In vivo/in vitro tests in guineapigs showed that it was very difficult to maintain non toxic blood nisin levels high enough to suppress the growth of tubercle bacilli Nisin seems to be less active against virulent strains of *Myco tuberculosis* than has been supposed

Nisin seems to be less toxic in guineapigs than has been reported for rabbits. The LD50 was apparently about 100 mg per kg of body weight when nisin was given very slowly by the intravenous route

The effects of nisin on respiration, isolated heart uterus, and ileum are described

The corneal experiments were carried out by Prof J M Robson and Dr R T W Rees in the Pharmacological department of Guy's Hospital and this work is gratefully acknowledged We wish also to thank Dr A Hirsch for many useful discussions, and are indebted to Messrs Fisons Ltd for permission to publish.

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THE EVALUATION OF EOSINOPHIL COUNTS *

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It is the purpose of this paper to draw attention to the diurnal variation in number of the circulating eosinophil cells, and to evaluate the importance of these changes when assessing the significance of eosinopenia following the administration of certain drugs

Zappert (1893) found that eosinopenia accompanied certain infections while Lams (1907) found that during convalescence from these infections there was eosinophilia This led to the belief that eosinophilia during some illnesses presaged imminent recovery but Roche Thorn and Hills (1950) showed that if eosinophilia occurred too soon after a surgical operation it was of bad prognostic significance

These phenomena have been partially explained since attention has been focused on the hormones of the adrenal cortex Eosinopenia has been shown to take place during the so-called alarm reaction (Dalton and Selye 1939) following injection of compound F or of adrenocorticotropic hormone (A.C.T.H.) (Hills et al 1948) and following oral administration of cortisone (Swanson 1951) Making use of this knowledge Forsham Thorn et al (1948) devised tests which they believed gave some indication of the functional state of the adrenal cortex One test entailed eosinophil-counts before and four hours after an intramuscular injection of 25 mg of A C T H They considered that a fall of eosinophils in four hours to less than 50% of the initial figure was evidence of adequate function of the adrenal cortex

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A similar test with adrenaline was believed to test pituitary adrenocortical function (Recant, Thorn, et al. 1950)

However, Rud *(1947) pointed out that an eosinopenia* of this magnitude, without such external stimulus—i e, apparently "spontaneous"†—was commonly found He *and many* others (Sabin et al *1925*, Shaw *1925*, von Domarus 1931, Djavid 1935) noted that there was a diurnal variation in the number of these cells

Accordingly, we decided to investigate the normal "spontaneous" daily change in the number of eosinophil cells during a study of the reaction of a group of healthy and arthritic subjects to various stressing agents

SUBJECTS

The following groups of people were studied

(1) Five healthy persons (three men and two women) aged 21–49 years

(2) Five patients (two men and three women), aged 16–59, suffering from active rheumatoid arthritis

(3) Three men, aged 21–42 years, suffering from rheumatoid spondylitis (This group is separated from group 2 because it is not universally accepted that the two diseases are the same)

The healthy subjects were on the hospital staff, and went about their daily work as usual, it was believed that the amount of stress they experienced would be relatively constant from day to day, and, indeed, when any external stress was applied, it was clearly reflected in the cell counts The patients were on an ordinary hospital routine, most were confined to bed, but a few were allowed up to use the bathroom Three meals were eaten as usual, at the same times each day All medicines (aspirin and phenobarbitone) were stopped forty-eight hours before the beginning of the study, but some patients were allowed physiotherapy during the part of the day when no tests were being made

METHODS

Mayet (1888) was the first to count eosinophils directly in a chamber, and although Dunger (1910) evolved a better technique, it is only in recent years that more reliable methods have been elaborated The two most commonly used at present were critically evaluated by Henneman et al (1949) These are (1) the eosin-in acetone method (Forsham et al 1948) which, being similar to Dunger's, has the disadvantage that the cells are easily destroyed by the acetone on shaking or on standing, and (2) the phloxine in propylene glycol method (Randolph 1944) which overcomes both these disadvantages Consistent results were obtained in pilot studies using either venous or capillary blood, though the reliability of the results when capillary blood is used has been questioned by Lucey (1950) since this study was completed

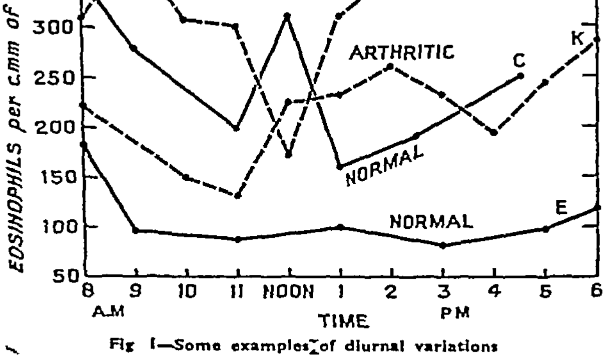

Fig 1—Some examples of diurnal variations

TABLE I—MAXIMUM DAILY VARIATIONS

	Subject	Sex	Lowest count in day (per c mm)	Highest count in day (per c mm.)	Percentage change	Hours taken for change	Average eosinophil count for one day (per c.mm.)
This series	Normal subjects						
	A	F	187	423	+126	4	332
	B*	F	119	172	−31	3	141
	C	M	214	342	+60	3	280
	D	M	50	145	+190	6	104
	E	M	64	154	+141	6	115
	Spondylitis patients						
	F	M	109	261	+139	6	193
	G	M	173	381	−55	3	319
	H	M	165	260	+58	7	198
	Rheumatoid patients						
	I	F	337	544	+61	3	389
	J	F	848	1164	+37	2	101
	K	M	131	278	+112	7	218
	L	F	35	485	+1286	5	228
	M	F	200	634	+217	6	437
Rud's series	Tables 17A and B						
	W 11	F	31	88	+184	1	74
	W 55	F	188	506	−63	3	310
	M 20a	M	56	106	+89	4	86
	M 10b	M	50	160	−70	2	91
	M 21a	M	50	181	+262	3	126

* *Counts only done in afternoon*

The difference between the lowest and highest values have been *expressed as a percentage of whichever figure occurred* earlier in the day

Capillary blood was used in most of the cases reported here, care being taken to obtain free flowing blood from a deep stab Two white cell pipettes (U S Bureau of Standards) were filled with blood to the 0 5 mark, and with phloxine propylene glycol to the 1·1 mark After staining for fifteen minutes the tubes were shaken for at least two minutes, and after discarding the first five or six drops, two double sided deep (2/10 mm) chambers (Fuchs Rosenthal) were filled from each pipette This fluid was allowed to settle for ten or more minutes, and then all the cells in two fields from each of the two pipettes were counted, if the two results did not vary from each other by more than ± 5, they were added together and multiplied by the factor 1 56 to give the number of eosinophils in one cubic millimetre of blood When the figures varied by more than ± 5, as happened only occasionally, the cells of all eight fields were counted Approximately 3000 *counts were necessary to obtain the data presented here* To remove excess redness from the slide and thereby facilitate counting, a green filter solution (one drop of 10% sodium picrate in 2% copper sulphate) was placed between the light source and the microscope

In all *cases* except one (case B), hourly eosinophil counts were carried out on at least one occasion from 8 A M until 6 P M The subsequent counts were only done hourly for the four or six hours during the tests

The adrenaline and A C T H tests were carried out as recommended by Roche, Thorn, and Hills (1950) and, in addition, cell counts were done each hour from the start for at least four hours

RESULTS

Experiment A To evaluate the importance of the diurnal variation

A diurnal variation in the number of cells was found in all cases Four examples of this are shown in fig 1 In most cases, the daily pattern was similar to that found by Rud (1947) and Appel (1938) a high early morning count falling until about midday, a slight rise thereafter, with a *fall again* in the early afternoon, finally a rise towards evening

The lowest and highest counts in any one day in each person in this series are given in *table I*, and, *for* comparison, percentages calculated from some of the figures obtained by Rud in 35 women and 18 men are also shown The difference between the lowest and highest values has been expressed as a percentage of whichever of the two figures occurred earlier in the day, thus, some are shown as a rise, and others as a fall. It will be seen that the range in one day may be considerable.

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† "Spontaneous" and "spontaneously" are used in this paper for want of better expressions to describe changes *occurring* without obvious cause

Fig 2 shows the magnitude of the fall in eosinophils which occurs "spontaneously" In the morning "spontaneous" falls greater than 50% occurred eight times (in 4 out of the 13 subjects) The time taken to complete the fall was usually three or four hours In the afternoon on the other hand, a fall, uninterrupted by any rise, was with one exception (case C) never greater than 40% in all 13 subjects Such uninterrupted falls were complete within two hours, with the exception of one patient (case I) whose eosinophils did not respond in the expected fashion until after 3 four hour and 2 forty-eight-hour tests suggesting an abnormal response of the adrenal cortex Fig 2 also shows the *total* change that occurred during the four hours 12 noon to 4 P M, in these, the early afternoon fall was offset by a greater rise later

Thus it is evident that caution must be exercised before it is concluded that an eosinopenia after A C T H or other agent given in the morning is due to that stress On the other hand if after a stress in the afternoon a fall should be greater than 40% especially if it lasted for more than two hours it could more reasonably be concluded that the fall was the result of that stress

Experiment B To evaluate the adrenaline test taking into consideration the diurnal variation

In the morning a fall greater than 50% was twice obtained in the same subject (case E table II), and at first glance this might be attributed to the drug However, on three other occasions in the same subject, "spontaneous" falls in the morning were equal to or greater than those after adrenaline This confirms the conclusion from experiment A that false conclusions may be drawn from morning experiments of this nature.

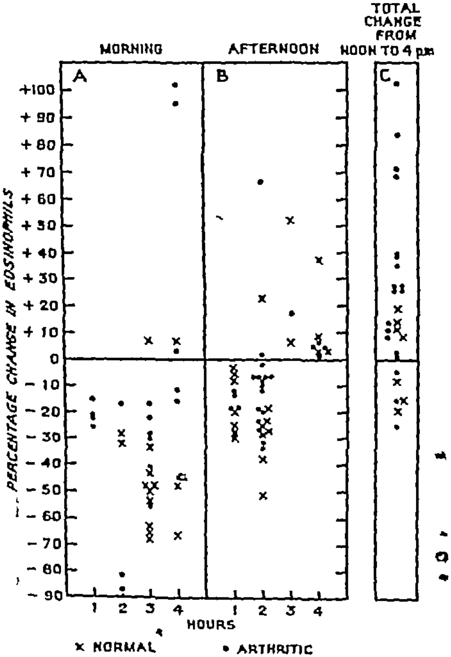

Fig 2—Comparison between spontaneous and uninterrupted morning and afternoon changes. A and B show the rise or fall during the period stated until terminated by a change of direction. C shows the total change (including both a fall and a rise) during the four hours.

TABLE II—ADRENALINE TESTS

Subject	Sex	Percentage change from initial count at				Maximum spontaneous fall at same time of day
		1 hour	2 hours	3 hours	4 hours	
Normal subjects (morning tests)						
E	M			−63	+11	−66
F		−4	−58	−63	−46	−60
Normal subjects (afternoon tests)						
B	F		−65	−66	−43	−28
A	F	−17	−35	−23	+20	−5
C	M	+18		−49	−30	−28
D	M	+4	−35	−18	−47	−33
Spondylitis patients (afternoon tests)						
F	M	+1	−60		−33	−13
G	M	−1	−43	−39	−3	−13
H	M	−45	−74	−35	0	−7
H		−59	−26		−24	−7
Rheumatoid patients (afternoon tests)						
I	F	−8	−31	−56	−47	−16
K	M	−17	−20	−23	−4	−27
K		+33	−6	+14	+21	−27
J	F	−15	−19	−16	−69	−20
L	F		−65		−64	−10

In the afternoon the test was done in 11 subjects because it was thought that a fall at this time—when a rise was usually otherwise expected—would have added significance. The results in table II show that a 50% fall occurred in only 1 of the 4 healthy subjects and in 5 of the 7 arthritic patients. In all but 2 of these the maximum fall occurred *before* the fourth hour Of the 2 exceptions, case J was certainly an abnormal response If however the criteria suggested after experiment A are accepted (falls greater than 40% lasting more than two hours) it will be seen that all but 2 subjects (cases K and I, both arthritic patients) had a significant response

Experiment C To evaluate the A C T.H test taking into consideration the diurnal variation.

Similar results were found here (table III)

DISCUSSION

The results of many physiological tests, such as the white-cell count (Garrey 1935), the red-cell sedimentation rate, and the plasma protein level (Renbourn 1947) may vary during the day The magnitude of the variation becomes important when comparisons are made between tests done at different times of day and when conclusions are drawn after artificially produced alterations. Wide variations in eosinophil-counts have been reported by Rud (1947) but his technique has been criticised (Smart 1950) because he allowed his acetone preparations to stand long enough for the cells to disintegrate (Henneman et al. 1949) furthermore his results were based on 2 counts made from one pipette only The same criticisms apply to most of the other work reported until recently Nevertheless some of the results of Rud and others are confirmed by this series.

Hills et al. (1948) on the other hand stated that the large falls observed after injection of A.C.T.H did not occur "under identical control conditions without the hormone," but they did not give details of the experiments upon which they base this statement Recant et al (1950) also found no variation larger than 40% of the initial control figure in their 6 healthy men but they did observe the afternoon rise However in these subjects the counts were done at two hourly intervals only, so that this he had been a ball clay getter in an underground working Nothing relevant was found in his family history

Personal History

In 1934 he had sustained fractured ribs on the left side, followed by acute bronchitis, and had had three or four minor attacks of bronchitis since There was no history of hæmoptysis For the last three years he had been complaining of increasing dyspnœa on effort, which was thought to be due to asthma. Several specimens of his sputum were examined for tubercle bacilli with negative results

Examination

His chief complaint was "panting" on the least exertion, and his chest was tight especially morning and night time He had a cough with a moderate amount of expectoration in the mornings only His general condition was only fair, and he said he had been losing weight for three years His chest showed some general restriction of movement and impairment of the percussion note over the upper lobes, particularly on the right side The respiratory murmur was harsh and high pitched generally, and there were some bronchitic sounds in the bases of the lungs. No abnormality was detected in the cardiovascular system The physical signs suggested a fairly severe pulmonary fibrosis without any definite evidence of a complicating tuberculosis

Radiography

An X ray film of the chest at Newton Abbot Hospital on April 30, 1943, showed generalised coarse discrete nodulation in both lungs, only the extreme bases being unaffected There was no evidence of tuberculosis apart from a few calcified foci in the hilar glands The appearances were considered to be those of classical silicosis in the third stage (fig 1)

Progress

The patient was examined again by the Silicosis Medical Board on July 18, 1945, when it was found that his condition had deteriorated—dyspnœa had increased so much that he could not sleep unless propped up with pillows He had a severe cough, largely non productive, and was subject to attacks of palpitation on effort In January, 1945, he had had an attac of pneumonia and been treated in hospital for three week He had been working intermittently as a labourer in th ball clay works, but had done no work on the grinding mi for almost a year Examination of his chest showed no sign ficant difference in the physical signs, except that there wa now diminished air entry into both bases and some tachycard (116 per min) Radiography on July 31, 1945, showed n change from 1943 He was certified to be totally disabled b silicosis He died on March 1, 1947, from a overdose of sleeping tablets, taken accidentall

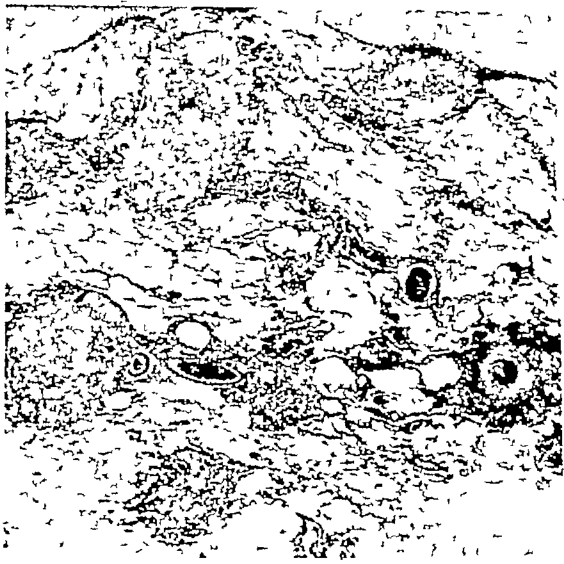

Fig 2—Lung tissue showing silicotic nodules and emphysema (case I) (×4)

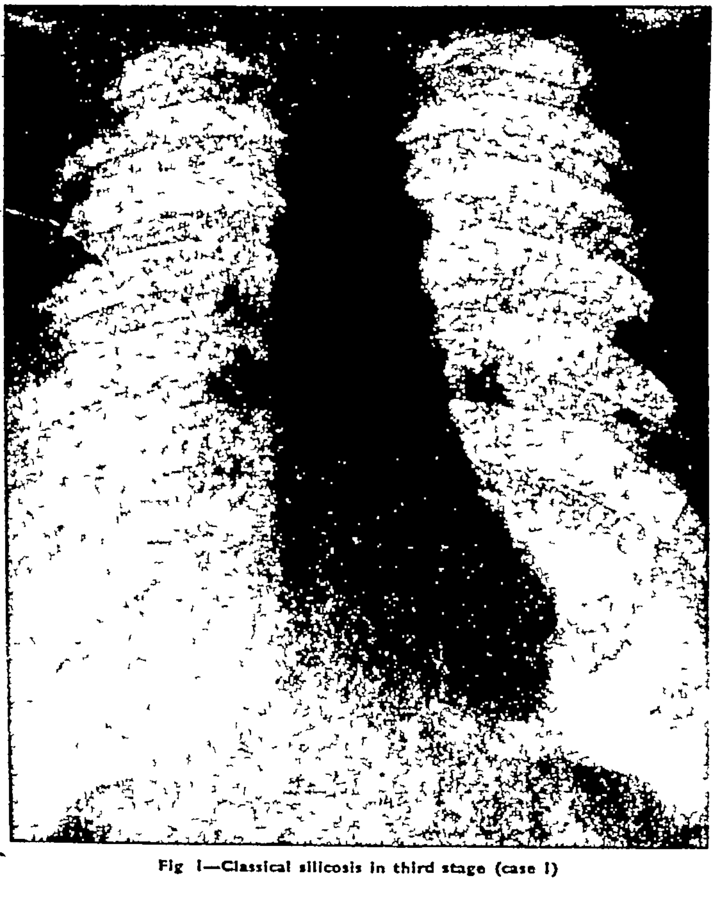

Fig 1—Classical silicosis in third stage (case I)

The Lungs

At necropsy the lungs showed a fairly advance typical silicosis, the nodules being fairly evenl distributed throughout both lungs There was n macroscopic evidence of tuberculosis The righ lung was sent to Prof E J King, Postgraduat Medical School of London, Hammersmith, fo histological and chemical examination. Th following report was made by Dr C V Harriso

Chemical Analysis—Ash, 8 812% of dry lung SiO_2, 1 23% of dry lung, 1 64 in total, Al_2O 0 34% of dry lung, 0 46 g in total

Gross Pathology—*Whole right lung* appear well fixed Numerous well-defined black silicoti nodules, mainly in upper half; with marke emphysema between them In upper part, nodule average 3–5 mm with about the same distanc between them In lower half nodules are ver scanty and 1–2 mm in diameter, but emphysem is marked even here *Root glands* average abou 12 mm diameter, are black and appear encapsu lated

Histology—The general appearances of th *upper lobe* confirm the naked-eye impression There are numerous large (3–4 mm) rounde nodules of silicosis and other smaller nodul (about 1 mm) The intervening lung shows mixture of irregular reticulin thickening alter nating with extreme emphysema (fig 2), so th amount of functional lung tissue is minimal There appears to be some bronchiolar dilation There is no sign of infection, either tuberculou or septic The silicotic nodules appear to be les concentrically whorled than usual. In the *middl zone* silicotic nodules are much fewer and smalle (1–2 mm) There is a fair degree of non nodula reticulinosis The intervening lung shows gros emphysema An occasional bronchus contain pus In the *lower zone* there is no nodular silicosi but there is a fair amount of rather diffuse reticu linosis There is emphysema but it is less sever than in the upper zones and there is more functional lung left. The *root glands* are totally replaced by dense collagen.

Comment — This is a case of nodular silicosis of moderately severe grade It shows more restriction to upper zones than usual and the fibrosis in the nodules is less whorled There is no sign of tuberculosis and no significant terminal infection.

Case 2 —This man unlike the former, was a china-clay worker He was never seen by the Silicosis Medical Board during life and the industrial history compiled after his death at the age of 56 may therefore be incomplete

He is said to have worked for a firm of china clay manufacturers for twenty five years and during the five years preceding his death he was employed in the trucking of dry china clay *presumably from the drying kilns to the mill house* We were informed that in the first twenty years of his employment with this firm he worked in the mill and never underground He is believed to have worked from 1918 to 1921 on the grinding of china stone and felspar for another firm. China stone (which may contain up to 30% free silica) is used as a pottery glaze and there is frequent interchange of workers between this and the allied china clay industry the works generally being situated close together

He was found dead at his place of work on July 8 1946 and the facts were reported to H.M Coroner who ordered a necropsy, which was *performed by Dr F D M Hocking of* the Royal Cornwall Infirmary Truro

Necropsy Findings —The base of the skull was fractured in the region of the foramen ovale This presumably happened when the man fell on the back of his head as the result of an attack of syncope The brain showed only bruising of the frontal lobes and very slight bleeding into the lateral ventricles as often accompanies concussion. There was a fairly severe toxic degeneration of the heart muscle and well marked dilatation of the right ventricle The abdominal organs were normal apart from some slight fibrosis of the kidneys and early nutmeg degeneration of the liver associated with the failing heart

The lungs were examined by the Silicosis Medical Board on Dec 6 1946 In the left lung a dense mass of tuberculo-silicotic tissue occupied the basal half of the apical lobe and the upper quarter of the basal lobe This mass showed caseating foci. Elsewhere there were moderate numbers of small classical silicotic nodules There was a moderate degree of emphysema. The right lung was like the left but in addition there was a small tuberculous cavity in the apex of the basal lobe

DISCUSSION

In case 1 the man had except for short intervals, been engaged in the ball clay industry all his working life It seems from the industrial history that he had not been exposed to any special dust hazard in fact, no risk in this connection was suspected From the clinical radiological and pathological evidence however, it is difficult to escape the conclusion that he contracted silicosis in the course of his employment and it is interesting to conjecture how this happened

An important factor in the production of silicosis—and indeed of all dust diseases—is the intensity of exposure Thomas (1937) has described a rapidly fatal type of silicosis in men exposed to heavy concentrations of highly siliceous dust and similar cases have been reported among tunnellers, sand blasters and others (Middleton 1936, Gardner 1933) In case 1 one may *infer that the risk was in the drying kilns and in the* grinding mill and although there is very little information available about the working conditions in these places it seems that the concentration of free silica in the air was sufficient to cause silicosis to develop in a comparatively short time.

Although the evidence pointing to a dust hazard in the ball-clay industry may not be very strong it does indicate the need for further investigation into the working conditions and for clinical and radiological examination of certain selected personnel

Though the incidence of respiratory disease in these workers does not appear to be abnormal and there is apparently little or no disability arising therefrom the fact that silicosis or pneumoconiosis can be present without causing any disablement should not be overlooked Often these conditions are discovered after routine radiography and not because of any complaints of chest trouble

A similar risk may exist, possibly to a less extent, in the other industries already mentioned, where there is a good deal of handling of the powdered clay Some attention has already been directed to the possibility of dust disease arising in the china-clay industry but no definite evidence on this has been forthcoming In case 2 the *evidence is perhaps insufficient to say that* the man contracted silico tuberculosis as the result of exposure to china-clay dust It is quite possible that this followed the inhalation of free silica while he was engaged on the grinding of china stone As there is frequent interchange of workers between the china clay and china stone works, this possibility cannot be overlooked and McLaughlin (1951) has records of two cases of deaths from silicosis among men engaged in the china stone industry At the same time, the results *of Kettle's (1934) experiments suggest that in association* with tuberculosis, china-clay dust can produce a fibrosis of silicotic type Further investigation on the lines previously indicated might help to clear this point

SUMMARY

So far as is known there have hitherto been no published accounts of the occurrence of silicosis in the English china-clay and ball-clay industries.

This paper describes two cases of silicosis (one complicated by tuberculosis) in these industries.

The findings are discussed with special reference to the possible danger to health resulting from inhalation of clay dust not only during certain stages of production but also in other industries where the clays are used in powder form

I am indebted to Dr A Massey chief medical officer Ministry of National Insurance for permission to publish these cases; to the British Ceramic Research Association Stoke on Trent for providing the analyses and much useful information about china clay and ball clay and to many friends for their helpful advice and criticism

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PENICILLIN-RESISTANT STAPHYLOCOCCI

DISTRIBUTION AMONG OUTPATIENTS

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The present investigation was made to determine the prevalence of penicillin resistant *Staphylococcus aureus* in the different outpatient departments of a hospital and to discover in which department and in what type of lesion lies the greatest risk of acquiring such a resistant infection

In a previous paper Cairns and Summers (1950) showed that in patients admitted to hospital with open infection (such that fresh organisms could have easy direct access to the lesion) the acquisition of a penicillin resistant staphylococcus is directly related to length of stay in hospital, and that this acquisition does not depend on the penicillin therapy which these patients receive at any rate in the early stages of their stay in hospital

TABLE I—SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN IN OUTPATIENTS AND INPATIENTS

—	No of patients	Sensitive	Resistant
Outpatients	568	433	135 (*24%*)
Inpatients	426	214	212 (*50%*)
Total	994	647	347 (*35%*)

The figures given in that paper and in this (table I) support those previously given by Barber and Rozwadowska-Dowzenko (1948), Martin and Whitehead (1949), Rountree and Thomson (1949), and Barber et al (1949), and confirm the impression that a hospital is a potential source of penicillin-resistant staphylococci Details of the material examined are given here to provide a basis for studies of techniques aimed at avoiding hospital cross infection or superinfection

MATERIAL AND METHOD

From January to September, 1949 (excluding three weeks), every strain of *Staph aureus* isolated in the department of bacteriology in the Radcliffe Infirmary, Oxford, was tested by the tube method for coagulase reaction, and on penicillin-gutter plates (Fleming 1942) for sensitivity to three different concentrations of penicillin The method adopted provided a clear cut distinction between resistant and sensitive organisms

The distinction is drawn by regarding all organisms which are inhibited by the weakest concentration of penicillin (1 unit of penicillin to 1 ml of agar in the gutter), and which are thus comparable with the Oxford H staphylococcus, as sensitive All others are resistant, and the higher concentrations (5 and 50 units per ml) were used as checks on technique, and for assessment of degree of resistance for a more detailed study of the organisms, which will be published later

TABLE II—SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN IN DIFFERENT OUTPATIENT DEPARTMENTS (ALL CASES INVESTIGATED)

Department	No of patients	Sensitive	Resistant
E N T	165	88	67 (*43%*)
Eye	74	58	16 (*21%*)
Casualty	261	237	24 (*9%*)
Outpatient	78	50	28 (*36%*)
Total	568	433	135 (*24%*)

The sources of the organisms and relevant details from all available case-records were noted Where a staphylococcus was isolated on more than one occasion from the same patient, only the first organism is considered here Where more than one strain of coagulase-positive staphylococcus was found in the same patient, the most resistant was chosen for study The number of outpatients examined was 568, and of inpatients 426

In the Radcliffe Infirmary, casualty patients and all outpatients other than those attending the ear, nose, and throat, and eye departments report in one large hall The casualty patients then wait in small corridors or in the casualty rooms, where bandages and plasters are taken off Ear, nose, and throat patients wait in a distant part of the infirmary, and the eye patients included went to a separate building in the hospital precinct

ANALYSIS OF RESULTS

The details are presented in tables I–VI In those tables where categories are assigned to cases according to hospital contact, only the staphylococci from patients whose previous notes could be traced are considered, but a comparison of tables II and III will show that the proportions of penicillin-resistant strains isolated are not significantly different if all cases are considered

It was only possible to analyse fully those cases (45 out of the total of 568 outpatients) where notes were available, and these were divided into two categories

Category A includes those cases where (I) at the time of isolation of the staphylococcus there is no record of previous hospital contact, (II) such contact has been infrequent (once only in two weeks, twice in four weeks, or thrice in eight weeks, in each case the latest hospital attendance being more than one week before the isolation of the staphylococcus); and (III) there has been no contact for three months or more before the date of isolation, the lesion having healed in the interval

Category B includes the remaining cases—those in which contact with hospital had been frequent—that is, at least twice in two weeks, and in most cases more frequently and over a long period

TABLE III—SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN IN OUTPATIENTS ACCORDING TO FREQUENCY OF CONTACT WITH HOSPITAL (FIGURES DERIVED FROM CASE NOTES)

Department	Category	No of patients		Sensitive		Resistant	
E N T	A	75	125	59	73	16 (*21%*)	52 (*42%*)
	B	50		14		36 (*72%*)	
Eye	A	50	62	43	48	7 (*14%*)	14 (*23%*)
	B	12		5		7 (*59%*)	
Casualty	A	208	220	196	206	12 (*6%*)	14 (*6%*)
	B	12		10		2 (*17%*)	
Outpatient	A	36	51	27	31	9 (*25%*)	20 (*39%*)
	B	15		4		11 (*73%*)	
Total	A	369	458	325	358	44 (*12%*)	100 (*22%*)
	B	89		33		56 (*63%*)	

A, contact with hospital infrequent or none
B, contact with hospital frequent

The cases were divided further into subgroups according to whether the lesions were open or closed, and according to diagnosis The definition of an open infection is given above A closed infection is one in which there is no simple direct access to the lesion by cross-infecting or superinfecting organisms The large casualty subgroup of septic hands, arms, fingers, toes, &c, is considered here as closed, whereas it was considered as open in the inpatient group (Cairns and Summers 1950) This change is required because inpatients' lesions are almost invariably opened, rendering them more readily superinfectable than in their most commonly closed initial state

The subdivision into open and closed cases is summarised in table V

TABLE IV—SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN ACCORDING TO OUTPATIENT DEPARTMENT AND LESION

Lesion	Department	Diagnosis	No of patients	Category A			Category B		
				Total	Sens	Res	Total	Sens	Res
Closed	Eye	Carbuncle	2	2	2				
	Casualty	*Septic	156	151	142	9	5	4	1
		Abscesses	64	58	55	3	6	5	1
Open	E N T	Sinusitis	65	38	30	8	27	8	19
		†Ear discharge	32	18	16	2	14	5	9
		Post fenestration	10	2	2		8	1	7
		Nasal swab	7	5	3	2	2		2
		Throat swab	8	7	7		1	–	1
		Miscellaneous	3	3	1	2			
	Eye	Conjunctivitis	45	35	27	8	10	4	6
		Blepharitis	12	12	11	1			
		Miscellaneous	3	2	2		1	1	
	Outpatient	Skin	16	16	7	9			
		All septic wounds	14	7	3	4	7	1	6
		Miscellaneous	21	18	16	2	3	2	1

* Septic fingers and thumbs 108 cases hands pulp spaces, and forearms 39 cases, feet 6 cases, and blisters, 3 cases
† Ear discharge includes chronic suppurative otitis media and mastoid affections 22 cases, and discharge from external ear 10 cases
A contact with hospital infrequent or none
B contact with hospital frequent

TABLE V—SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN IN OUTPATIENTS ACCORDING TO LESION

Lesion	Category	No of patients		Sensitive		Resistant	
Closed	A	211	222	199	208	12 (6%)	14 (6%)
	B	11		9		2 (18%)	
Open	A	165	236	126	148	39 (24%)	88 (37%)
	B	71		22		49 (69%)	

A contact with hospital infrequent or none
B contact with hospital frequent

The high incidence of penicillin resistant staphylococci is thus clearly seen to be associated with frequent attendance at hospital, particularly in the ear nose, and throat eye, and outpatient departments and with the presence of an open lesion although there is also a considerable increase of less significance in the apparently closed group with frequent hospital contact Casualty patients seem to be more fortunate, but they too run some risk of acquiring a penicillin resistant staphylococcus from frequent hospital contact Possibly patients who have to be frequent attenders are so because of the resistant nature of their staphylococcus.

The possible effect of penicillin therapy on the acquisition of penicillin resistance is tested in table VI The groups in table VI are not large but with the ear nose, and throat cases there are enough to indicate that previous penicillin treatment increases the incidence of penicillin resistant staphylococci among frequent hospital attenders, more than does frequent attendance without penicillin This may be due to a longer exposure of the treated group to the potential source of superinfection rather than to any effect of the drug; Cairns and Summers (1950) showed that, among inpatients there is no significant difference in the incidence of penicillin resistant staphylococci between those patients who had received penicillin before isolation of the organism and those who had not

TABLE VI—ANALYSIS OF THE EFFECT OF PENICILLIN TREATMENT ON SENSITIVITY OF STAPHYLOCOCCUS TO PENICILLIN IN OUTPATIENTS WITH FREQUENT HOSPITAL CONTACT

Department	No of patients	Previous penicillin treatment			No previous penicillin treatment		
		Sens	Res	Total	Sens	Res	Total
E N T	60	3	15 (83%)	18	12	30 (71%)	42
Eye	12	4	1	5	3	4	7
Cas	12	3	3	6	5	1	6
O P	15	1	1	5	5	5	10
Total	99	11	23 (70%)	34	25	40 (62%)	65

CONCLUSIONS

In table I comparison is made between the incidence of penicillin resistant organisms among strains of coagulase positive *Staph aureus* isolated from 994 inpatients and outpatients at a hospital in 1949 Details of the outpatients are analysed in tables II VI

Table II shows that the highest proportion of resistant organisms was found in the ear, nose and throat department rather fewer in the outpatient department proper fewer still in the eye department and fewest of all in the casualty department

Table III shows that hospital attendance greatly increased the chances of acquiring a penicillin resistant staphylococcus.

Table IV gives the distribution by diagnosis and indicates which types of case are considered as open lesions and which as closed

Table V summarises table IV and shows the far higher incidence of penicillin resistance among organisms from open lesions than among those from closed lesions It also shows the relation of resistance to frequent attendance at hospital, although the significance of the figures of closed cases is rather vitiated by the small number of frequent attenders in this group

Table VI shows that in the ear nose and throat department particularly there is a difference between the percentages of resistant staphylococci isolated before and after penicillin therapy This may be due to the previous use of penicillin but this interpretation is open to question and is not supported by comparison with the effect of penicillin therapy on the inpatient group (Cairns and Summers 1950)

I should like to thank Dr R L Vollum for initiating this research and for his criticisms constant encouragement, and valuable suggestions Dr H J F Cairns who began the work before he left Oxford has provided much invaluable criticism and many suggestions. I am also grateful to the heads of the various departments in the Radcliffe Infirmary for permission to examine their case records and particularly to the staff of the Radcliffe records office for their persistence and patience in searching for the case notes of a thousand patients

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Reviews of Books

The Individual and His Religion

GORDON W ALLPORT professor of psychology, Harvard University London Constable 1951 Pp 163 12s 6d

THIS urbane and sincere chronicon is welcome too long the polemical tendencies of theologians and psychiatrists, and their grounds of mutual complaint have kept them at odds with one another Professor Allport points out that religion has now stepped into the place which sex occupied fifty years ago William James could write a glowing book on the varieties of religious experience, while he devoted barely two pages in his exposition of psychology to the rôle of sex in human life; whereas now psychologists write with the frankness of Freud or Kinsey on the sexual passions of mankind but blush and grow silent when the religious passions come into view Whatever psychologists and psychiatrists may write there is still abundant evidence that human beings everywhere continue to be profoundly influenced by religion—though not always in its traditional forms. There have moreover never been lacking experts on both sides who sought a rapprochement though too often in the process they have shut their eyes to inherent obstacles, and produced a wishy washy by blow which sound religion and sound psychology alike abjured Professor Allport writes of course, as a psychologist rooted in the scientific method He makes no assumptions and no denials regarding the claims of revealed religion but limits himself to the task of discovering the place of religion in the life of normal mature individuals Also he is not a psychiatrist, and he remarks *significantly* upon the disproportion between the attention given by modern dynamic psychology to hostility aggression rivalry, power and anxiety on the one hand and *on the other* the microscopic amount of space devoted to the friendly attachments in human relationships Psychotherapy knows the healing power of love but finds itself unable to do much about it. This as he recognises may be unfair to some tendencies in psychiatry but leaves undisputed the comparative neglect of religion as a controllable power in furthering mental health

The origins of the religious quest and the development of religion in youth and mature life occupy the first half of the book the rest is devoted to conscience the nature of doubt and the nature of faith It is pleasantly written and within the scope set by the author's psychological training and intention it offers a carefully reasoned and often searching inquiry into this weighty problem hitherto beset with prejudice and the blunders of well meaning but shallow conciliators

A Synopsis of Ophthalmology

J L C MARTIN DOYLE, M R C S, D O, surgeon, Worcester City and County Eye Hospital, consultant ophthalmologist to the Ministry of Pensions and Ministry of National Insurance Bristol John Wright & Sons 1951 Pp 246 20s

THIS little book aims at giving the reader a bird's-eye view of ophthalmology in a small space Each subject has one or two paragraphs, and, in the space allowed, Mr Martin-Doyle has condensed the maximum amount of accurate and up-to-date knowledge The type is easily read and the book fully indexed In short, the author has produced a serviceable book for general practitioners and medical students, and he has also earned the thanks of his ophthalmological colleagues by tabulating in alphabetical order a list of ocular syndromes under their endless names, together with their pathology, ocular signs, and general signs Mistakes are few and mainly too insignificant to mention, but it should perhaps be noted that the coagulation seen ophthalmoscopically in diathermy operations is coagulation of the *retina* not of the choroid

More About Psychiatry

CARL BINGER, M D, associate professor of clinical psychiatry at Cornell University Medical College London Allen & Unwin 1951 Pp 201 10s 6d

THIS collection of articles represents a skilful effort to make some aspects of modern psychiatry plain to laymen and medical students or practitioners

The language is successfully simple for its purpose, and the outlook on psychological medicine is that which we now commonly associate with the United States—psycho analytic, aspiring, confident, expansive The final chapters of the book indicate in their titles—"New Partnerships for Psychiatry," and "The Last Best Hope of Earth"—in what direction Dr Binger looks the earlier chapters explain those psycho somatic relationships which have been *so famously studied* at Cornell, and some intermediate chapters deal with general matters such as anxiety, mental health, choosing a mate, and (an amplified version of an article in *Harper's Magazine*) "Why the Professor Fell Out of Bed" which is a homily on the need for psychiatry "to permeate medicine and surgery and all the specialties"

Although the author has not devoted space to explaining the limits or the limitations of psychiatry, the book is better than many other semi-popular works of the kind, because of the easy but not slipshod style, the emphasis on the close bonds between psychiatry and general medicine, and the avoidance of inflated claims for psychotherapy

Plastic Surgery of the Nose

JAMES BARRETT BROWN, M.D, professor of clinical surgery, Washington University School of Medicine, St Louis, Mo, chief consultant in plastic surgery, United States Veterans Administration, Washington, D C, FRANK McDOWELL, M.D, assistant professor of clinical surgery, Washington University School of Medicine, St Louis, Mo London Henry Kimpton 1951 Pp 427 £5 5s

IT is always a pleasure to read a book such as this, with large clear print, on good paper, and with large clear diagrams and good photographs Very nearly half of it is concerned with "cosmetic" surgery—the reduction of the nasal hump, and the more difficult problems of adjustments of the tip cartilages This section is very good and the diagrams are most helpful, though the text is at times obscure what, for instance, does it mean "to cut the septum clear down to the nostril height?" For building up the bridge line the authors favour preserved human cartilaginous implants, and have had good results The section dealing with secondary nasal deformities following cleft-lip operations is full of useful recommendations They describe only those operations they have found of value, and these are supported by photographs Nasal repairs requiring skin replacement follow orthodox lines, with supraclavicular free grafts, composite ear grafts, forehead flaps, and arm flaps all finding a place War injuries receive special attention There is also information on prostheses and tattooing

Diseases of the Nervous System (4th ed Lon Oxford University Press 1951 Pp 1002 42s)—Dr Russe Brain's standard work, growing with the times, records advances in the treatment of meningitis, *subacute combined* degeneration, epilepsy, and parkinsonism, and carries new sections on leptospiral meningitis, temporal arteritis, infectious mononucleosis, sarcoidosis, and compression of the median nerve in the carpal tunnel Recent work has been included on the frontal lobe, the motor cortex, spasticity, and sensation The book remains a well balanced meal for the student concerned for the approach of the examiners, and a stimulating aperitif for his more romantic *colleague dreaming of a life dedicated to neurology*

Pathological Histology (4th ed Edinburgh E & S. Livingstone 1951 Pp 506 40s)—Dr Robertson F. Ogilvie's book, beautifully illustrated by Mr T C Dodds's photomicrographs in colour, is by now a valued friend o teachers and students The text has been revised an amplified, and the pictures increased to nearly 300 As Prof A. Murray Drennan points out in a foreword, when a studen examines a microscope slide there is no guarantee that he ha applied his teacher's description to the correct area But i these splendid pictures the same beauties confront the eye o any beholder, and can be indicated precisely with a forefinger Communication thus established, the student ca examine his slides and pluck out the heart of their mystery

The Rational Treatment of Catarrh (London Chaterson 1951 *Pp* 85 *10s 6d*)—*In this monograph* Dr W Annandale Troup asserts with no little dogmatism that th Kromayer mercury vapour lamp, used intranasally as h directs, is a panacea for what he calls nasal catarrh He doe not define this condition, but the name seems to cover th watery rhinorrhœa, viscid mucus, muco pus, or frank pus o various affections ranging from allergy to chronic sinusiti If so, he shows no awareness that the character of the di charge may have any diagnostic significance Though it i possible that ultraviolet light may benefit some pathologica nasal conditions, Dr Troup does not present the claim in *manner likely to inspire belief*

Modern Dietary Treatment (3rd ed London Baillière Tindall, & Cox 1951 Pp 355 *21s*)—Doctors and dietitian alike will welcome a new edition of this comprehensive littl textbook by Miss Margery Abrahams and Miss E M Widdowson, D SC It deals with the theory of diet, its quantitativ and qualitative aspects in various diseases, food table menus, and recipes In their preface the authors note tha the past ten years have changed our attitude to nutrition We have learnt much—especially how to use food economically Rationing and subsidies have levelled up British standards i eating, and diets at two levels of cost are no longer include in this book Tables showing the chemical composition o foods, and their vitamin contents, have been brought up t date, and the text has been revised It is now a commonplac that the national health, thanks to an able rationing system was better at the end of the war than it had been in 1939 This book reminds us of the detailed work on which rationing was based

Gynæcological Endocrinology (2nd ed Edinburgh E & S Livingstone 1951 Pp 121 12s)—Dr P M F Bishop ha largely rewritten his useful little book, though its general form and arrangement remain the same The original chapters on th endocrinology of menstruation and its disorders, the menopause, infertility and pregnancy, and hormone assays, hav been brought up to date with care and accuracy, and a surprisingly readable chapter on steroid chemistry has been added The appendix on commercial preparations has been replaced by five short appendices dealing with therapeutic schedules, *the relative potency of the various œstrogens* in common use, case cards, and menstrual and basal temperature charts There are some new and better diagrams, as well as a solitary photograph of a case of Turner's syndrome, the particular purpose of which is not quite clear Dr Bishop still handles his subject dogmatically, giving no references or bibliography Perhaps he thinks it would be hardly practicable to do so with so voluminous a subject and so small a book He makes one rather dangerous statement—that carbon dioxide, oxygen, or air can be used indiscriminately for tubal insufflation. It is now generally accepted that carbon dioxide is by far the safest for this purpose

THE LANCET

LONDON SATURDAY, JANUARY 19, 1952

Colleges and Faculties

ON Dec 8, in giving our support to the project for establishing an academic body to represent general practitioners, we suggested that it should take the form of a faculty attached to the three Royal Colleges Our hesitation about the formation of a College of General Practitioners had two bases First, we think that the need of these times is to begin to reintegrate the various branches of medicine and we do not believe that the best interests of the profession will be served by separatist movements that may presently fill the medical scene with quite a number of new colleges—not only of general practitioners, but also of pathologists, pædiatricians psychiatrists, and others Secondly, though much less important, we think that an academic body for general practitioners could be given a good start by formal association with the existing colleges and if it gained and used their support would become influential sooner than if it worked alone Dr JOHN HUNT and Dr F M ROSE, in announcing the formation of a steering committee to consider the next step, have said that this proposal of a triple link with the Royal Colleges shall have thorough study, and we ask no more But the objections expressed by all the other practitioners who have written to us make it necessary to repeat our arguments and try to make them plainer

The objections are expressed strongly In our present issue Dr K. T BROWN describes our suggestion as "most dangerous, and insists that the new organisation must be utterly independent 'I do not mean," he adds "we should live in a vacuum we can have plenty of liaison with existing bodies of all kinds but we must meet them as equals.' Dr D G FRENCH, on Dec 20 expressed even more vigorously the general practitioner s desire for separate salvation he wants the new college placed in one of the provincial university towns away from the political influence of the Royal Colleges' But perhaps the most persuasive contribution is the eloquent but temperate letter of Dec 22 in which Dr R. J F H PINSENT argued that general practice is entitled to the prestige and consideration of a parent so far from being a specialty it is the mother of all the specialties He summarises the case against our proposal when he says

> 'General practitioners must achieve their college as their right and just due They owe it to the memory of countless generations of predecessors in their practices that they accept no compromise title which carries with it the implication of inferiority to a college General practitioners have been in a position of inferiority vis à vis the specialists for years and it is this that they seek to amend Were such an alternative title to be accepted, future general practitioners would bear the handicap of a decision made on the grounds of the political expediency of the moment, and they would have good cause to reproach those who lacked the courage to stand firm In British usage a college will always rank higher than any other academic body and no lesser title can be acceptable for the senior discipline of the medical art

We agree with our correspondents that even to gain a large immediate advantage general practitioners should not accept any implication that they are a junior or inferior kind of doctor whose affairs should be managed for them by specialists We accept the view that general practitioners are as much entitled to a college as are physicians or surgeons But we think that too little attention is being paid to the changes that are taking place in the colleges by which they are becoming something more than groups of specialists of one sort The Royal College of Surgeons (quite apart from the fact that it has many general practitioners among its fellows) is the centre of a group of more or less closely affiliated faculties representing anæsthetists, ophthalmologists, and dental surgeons, and has representatives of these faculties, as well as of general practice on its council The comitia of the Royal College of Physicians, so far from being a body of internists, is now a remarkably catholic assembly, comprising almost every kind of doctor except (at present) general practitioners. With this tendency in mind we suggest that the three Royal Colleges should no longer be regarded as vocational groups of specialists their proper task is to promote the growth of medical art and science, in its three main divisions, and their fellowships should eventually include the *men and* women from any part of the profession, who can best help in this task This conception of the Royal Colleges would be easier to grasp if they dropped their vocational titles and became the Royal College of Medicine (as Dr JORDAN suggests on p 150) the Royal College of Surgery, and the Royal College of Obstetrics and Gynæcology but names in use for centuries or even decades are not readily altered, and English institutions after all, are noted for *performing new* functions under old titles The new function with which the colleges are jointly charged is the development of the whole of medicine and, for its better performance, they are already ceasing to be closed corporations composed of one particular kind of doctor The further this desirable process goes the more necessary it will be to have, in association with them academic bodies severally representing each of the avocations of the profession. Supposing for argument s sake, that there were only one college, the natural and obvious arrangement would be to make this the nucleus of a ring of vocational faculties, thus incidentally ensuring its activity The fact that there are three colleges instead of one does not alter the logic of the scheme and their evolution into integrating bodies would be hastened by the attachment of a ring of vocational faculties to the three in common. Admittedly some avocations have closer affinities with surgery than with medicine, but the differences in relationship within the medical family are far from precise and what really matters is to bring the family together The existing faculties of the Royal College of Surgeons should we suggest be joined equally to the other two colleges and new faculties should gradually be formed to represent all the major avocations of medicine—including internists and surgeons Apart from any formal links it is clear that the colleges would increasingly draw their strength from these faculties fellowship in any one of which might entitle the holder to nomination to the fellowship of the college to which his work was most closely related

Our argument rests on the belief that the three Royal Colleges are in process of becoming colleges of medicine, surgery and obstetrics rather than closed corporations of physicians, surgeons, and obstetricians If that is their tendency, and if this tendency can be continued, the profession would surely be ill advised to create a new college—a new closed corporation—for even the largest of its vocational groups Granted that it is the senior member of the profession, general practice could surely accept an honoured place in a circle of equals which had a professional and not a vocational centre

Bracken *versus* Aneurine

THIS is a story of antagonists, opening in Wales, but their antagonism is chemical, not personal, and its significance is nutritional rather than political Its discovery has established the cause of "staggers," a serious affection of horses and other animals, and may well have wider implications The disease, which is familiar to veterinary surgeons and stockbreeders, starts with a slight swaying in the animal's gait, its staggering becomes more severe, and it stands with feet wide apart and arched back, violent muscular tremors appear next, and in the final stages, when the animal lies on the ground unable to raise itself, there may be general convulsions

A connection between staggers and feeding on bracken (*Pteris aquilina*) has long been recognised, especially in Wales, where the disease is widespread among cattle and has involved farmers in serious financial losses Experimentally, the inclusion of 20% of dried bracken in a good hay diet has been shown to produce staggers and death within a month Now ROBERTS and his colleagues,[1] at the school of agriculture of the University of Wales, Aberystwyth, have demonstrated that staggers is a manifestation of aneurine (thiamine) deficiency caused by an aneurine splitting enzyme present in bracken, and may therefore occur despite an adequate intake of aneurine In a horse that had developed staggers after feeding on dried bracken they relieved the symptoms by injecting large amounts of aneurine, but the symptoms returned when the injections were stopped They have succeeded in isolating the anti aneurine factor from air-dried bracken, but not from samples that were dried in the sun This is because the factor is thermolabile, being inactivated by autoclaving It is probably a protein, since deproteinised extracts of bracken do not affect aneurine Rats develop signs of aneurine deficiency when the bracken factor is added to their food Chromatography has shown that the factor breaks down the methylene bridge joining the pyrimidine and thiazole parts of the aneurine molecule, and BERGEL and TODD[2] established fifteen years ago that this destroys its vitamin activity, the products can be used as a growth factor by micro-organisms but are of no use to mammals

This is the first time an aneurine-splitting enzyme has been discovered in a plant Hitherto the only well-known source of such a substance has been raw fish This was revealed when a series of outbreaks of a highly fatal form of paralysis on American fox-farms was traced to the raw fish included in the foxes' diet The disease was first noted by GREEN[3] in 1932, on the Minnesota farm of Mr J S CHASTEK hence its name, "Chastek paralysis" It was lat shown to be an aneurine-deficiency disease, by an aneurine splitting enzyme similar in lability and mode of action[4] to the one in bracken which is present in carp, mullet, smelt, and herrings shrimps, oysters, and some kinds of mussels There is no danger of these fish causing aneurine deficiency in man or animals, provided the fish is well cooked In countries where raw or partly cooked fish, fresh or canned, is a popular item of the diet, aneurine deficiency might arise from this cause, though no examples seem to have been reported It is certainly risky to give raw or half-raw fish to domestic or other animals

The anti-aneurine enzymes or "aneurinases," in bracken and fish should not be confused with the aneurine antimetabolites, such as pyrithiami or oxythiamin The aneurinases are thermolabile factors which destroy aneurine by enzymic cleavage The antimetabolites are compounds of similar composition to aneurine—what the chemists call structura analogues—which compete with it in enzyme systems Under favourable conditions the antimetabolite i fixed by the enzyme in place of aneurine Withou the participation of aneurine the enzyme system cannot function, and the characteristic symptoms o aneurine deficiency are the result Antimetabolite of this kind are useful experimental tools for the rap production of vitamin deficiencies in animals Mos of the known vitamins—A and D are the ma exceptions—can be blocked by structural analogue in this way The best-known example is the blockin of *p* aminobenzoic acid by sulphonamides, which the *basis of their antibacterial action* Then vitamin can be blocked by gluco ascorbic acid, vitamin K b dicoumarol, biotin by desthiobiotin, pantothen acid by pantoyltaurine, pyridoxine by desox pyridoxine, nicotinic acid by sulphapyridine pyridine sulphonic acid, and riboflavine by some of th antimalarial drugs, such as mepacrine The insecticid 'Gammexane' (the γ-isomer of hexachlorocycl hexane), interferes with the metabolism of inosito an essential nutrient for insects These vitami antagonisms are more easily understood from th structural formulæ of the compounds

Since the whole of intracellular metabolism whether animal or vegetable—and perhaps life itself—is made up of enzyme systems, one would expec structural analogues to bulk largely in therapeutics But, apart from their invaluable applications a weapons against micro organisms, their clinical us so far seems to be limited to the treatment o leukæmias with the antimetabolites of folic (pteroyl glutamic) acid—aminopterin, 'Met-Fol B' (methyl pteroic acid), and amethopterin (4-amino N_{10} methylpteroylglutamic acid) In animals all thes produce a folic acid deficiency syndrome, whic includes a leucopenia There was reason to hop that they would therefore control leukæmias, bu they have proved a disappointment No cures hav been recorded and the best they can offer is temporar improvement in 1 out of 3 or 4 carefully selecte cases, in view of the severity of their side effect this does not justify their use But this failure shoul not prejudice us against the principle of analogue therapy, which may yet become one of medicine' mainstays

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[1] Roberts F Evans F T R Evans W C *Vet Rec* 1949, 61, 519 Evans, W C Jones N R Evans, R A *Biochem J* 1950 46 proc xxxvi Evans E T R Evans W C, Roberts H E *Brit vet J* 1951 107 364

[2] Bergel F Todd A R *J chem Soc* 1937 p 1504

[3] Green R G *Minn Wildlife Dis Invest* 1936 3 83

[4] Krampitz, L D, Woolley, D W *J biol Chem* 1944, 152 9

Punishment in Approved Schools

LIKE the borstals the approved schools were thrown out of gear by the war. Training was handicapped by lack of adequate quarters, admissions rose, and many members of the staffs were called up. The period of training was therefore reduced; but though this relieved the pressure, it meant that large numbers of young people were released on whose good behaviour it was impossible to count at all confidently. The schools are now regaining their former standard, but this is in any case not uniform. There are 136 of them in England and Wales, 108 being run by charitable or religious organisations and 28 by local authorities; and inevitably some are better run than others. In 1948 the Home Secretary appointed a committee, with Mr H. W. F. FRANKLIN as chairman, to review punishments in prisons, borstals, approved schools and remand homes. This committee published parts I and II of their report[1] last year and parts III and IV, dealing with approved schools and remand homes, have now appeared.[2]

On the whole the report gives a reassuring picture of the way the schools are run, though it shows how great are the difficulties of running them, especially those for senior girls. These girls, the committee note, present far more serious problems than the senior boys, being often emotionally disturbed and highly sexed and sometimes having a degree of sexual experience behind them greater than that of mature women. Violent hysterical outbursts are common among them, and their educational and mental age is usually low. Most of the schools take only 20–30 girls and the rooms used by the staff are scattered among them; the staff are thus more or less continuously on duty, and even in their free time get little rest from the noise and the problems of the school. Some of the headmistresses feel it impossible even to take their annual leave. The committee rightly urge that the provision of separate staff blocks in these schools should be considered and that the headmistresses should have the option of retiring at 55. They also suggest that there should be a separate punishment block where the screamer and the exhibitionist could be sent on occasion to prevent them upsetting the whole school. It is hard to tell whether this is a sound idea or not. The aim is to get these excitable young women to live in ordinary society; but of course in an approved school they are not living in ordinary society: they are among others as disturbed as themselves, and nothing encourages a hysteric to give freer vent to hysteria than the presence of other hysterics, as CHARCOT inadvertently found out. To put a girl into a separate punishment block would certainly deprive her temporarily of an audience and probably cut short an outburst; but it could hardly be expected to produce a lasting cure. Nevertheless even a temporary remission would probably be welcome to her associates. There must however be better ways of dealing with girls of this type, though we have yet to find them.

The committee comment on the high quality of the staff in most approved schools, whether for girls or boys; but they note too that some schools are not as good as others and that there has been recent evidence that brutality and indecency are not extinct in some. This disquieting criticism applies, they say, to only a few schools and they do not go into details. Punishments include loss of rewards or privileges, temporary loss of recreation (usually associated with a fatigue such as floor scrubbing or potato peeling), separation from the others either in a special detention room or in some other room not in use at the time, and corporal punishment strictly limited by regulation. Most of the headmasters and headmistresses agreed when the rule was deleted which allowed alteration of meals as a form of punishment, and are strongly opposed to a return of this measure. But at one school receiving particularly difficult girls permission has been sought to use as a punishment a special diet of plain meals for a week. This would mean that the girl would go without a cooked dish at breakfast and without jam and cake at tea, but she could eat as much as she liked of whatever was going at the midday and evening meals. The committee felt that this was a perfectly reasonable suggestion, and now that we are no longer strictly rationed the loss of such extras could not harm nutrition; and they were satisfied that children in approved schools feed very well. Again it is hard to know whether this is a good idea or not. On the face of it it looks sensible enough; but so much of our earliest emotional conditioning is associated with feeding that it is bound to be a different punishment from the one it seems. On the other hand some punishments are essential and this is an easy and convenient one to inflict. Immediate peace, however, is hardly worth buying if it proves to be at the cost of postponement of cure.

There are many safeguards to prevent any misuse or excess of corporal punishment. The canes used, the committee say, cannot be considered brutal weapons. They thought however that the cane used for senior boys was too thick and rigid and likely to cause bruises rather than pain, and with a solicitude which the recipients may well feel to be misplaced they have proposed instead a thinner longer one. No boy or girl suffering from any mental or physical disability may be caned without the approval of the doctor, and every caning is recorded in a punishment book. The committee found however that in one remand home and two approved schools a substantial proportion of boys who had been repeatedly caned showed evidence of being mentally abnormal. The temptation to try to beat a little sense into those whose mentality is deranged or insufficient has always been a hard one to resist, largely because it offers such relief to the exasperated beater. The committee wisely recommend that the mental state of boys who render themselves liable to repeated corporal punishment should always be most carefully investigated. And here it is appropriate to note that the population of approved schools is strikingly lower in intelligence than that of ordinary schools, children with an intelligence quotient (I.Q.) of less than 95 forming 60–70% instead of 30% and children with an I.Q. below 70 (i.e. educationally subnormal children) forming 6–14%. The committee recognise the need for better opportunities for psychiatric advice both for backward and for difficult children in approved schools and remand homes; and they recommend that residential psychiatric centres should be established regionally to which selected children could be sent for observation and treatment They hold that such centres should be under the Home Office rather than the National Health Service, because the special *problems of the schools would be better* understood by Home Office staff

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[1] Prisons and Borstal Institutions. H.M. Stationery Office. 1951. See *Lancet*, 1951, i, 1309.

[2] Approved Schools and Remand Homes. H.M. Stationery Office. 1951. Pp. [illegible] 2s. 6d.

The committee press home an important lesson from their findings many dull and unstable children become delinquent and find their way into approved schools because their special educational and medical needs have not been met in earlier years Here again, we seem to have failed to find the best way of doing things Schools and institutions for the mentally retarded, and child-guidance clinics with proper staff, are, they note, "tragically inadequate throughout the country" In many areas, indeed, child-guidance clinics do not exist It is a matter of chance whether the Ministry of Education, the Ministry of Health, or the Home Office is called upon to deal with any one difficult child[3], and the committee say they have "*observed a tendency to suggest that any particularly* difficult problem should be dealt with by another department" The only way of ensuring better justice for the problem child, they believe, would be to set up a strong interdepartmental committee with very wide terms of reference, to discover more exactly what needs to be done and to make suggestions for the best way of providing for the educationally subnormal, the maladjusted, and the mentally abnormal child, both after he has fallen into delinquency and while he may yet be led to avoid it Meanwhile they propose that the children's department of the Home Office should consider classifying some of the existing approved schools as places for separate treatment of very dull, emotionally unstable, problem children This would make it possible to give such children treatment appropriate to their disorders without an appearance of favouritism, and it would also make for the smoother running of the ordinary approved schools

Prevention, we have been telling each other since the dawn of human history, is better than cure It is also more troublesome, and this is the chief reason for its general neglect Nevertheless if ever there was a good cause in which to take trouble early, surely this is one Fewer neglected dullards and problem children would mean fewer delinquents, fewer prisoners, fewer recidivists, fewer professional criminals, and fewer dim-witted old lags of the type described by Norval Morris[4], and what a parcel of trouble that would spare us in the long run

Neither Bevan nor Bevin

Of the many fields in which national health can be cultivated, one of the largest and most fertile is industry This being so, the decision to exclude industrial medicine from the National Health Service came as a surprise and a disappointment—a disappointment the greater because an authoritative report from the Royal College of Physicians in 1945 had strongly recommended its inclusion[5] The decision was taken because the powerful Minister then in charge of the Ministry of Labour, the late Mr Ernest Bevin, was convinced that industrial medicine, which he set great store, would develop faster if th medical sides of the Factory Department, and of th other Government departments concerned, were no transferred to the Ministry of Health, where th would inevitably be subordinate and might soon become of less account Instead (we were led to understand) the industrial health services would develop in parallel and in association with the N H.S., playing their part more fully because the two organisations were not merged Since then we have had the report of the Dale Committee[6] which, if les constructive than was expected, at least made i clear how much need a nation in our position has o services that will improve the welfare and enlarg the production of its workers But very little seem to have been done so far to unify these services an increase their efficacy There has not been much sig of a central drive And we wonder what Mr Bev would think if he were now to read the memorandu on his department which we print on p 150 Writte to present the Howitt Committee with a particula point of view, this memorandum may dwell to much on the sombre side, but the impression it leave is that the leading department of industrial medicin in this country has insufficient staff and insufficie resources for its job Without these resources it h gained little from its independence To the Nation Health Service it is a distinguished but poor relatio obliged by limited means to live very quietly

A week or two ago the Treasury received a deput tion[7] from the joint committee which has be representing Civil Service doctors, and before fin conclusions are reached we feel bound to express our fe that the Howitt Committee's proposals[8] may confir this unsatisfactory relationship instead of improvi on it The range of salaries that the Howitt repo suggests for the higher medical posts in the Ci Service fixes the relative importance attached medical work in the various Government department and the inferior status of the three departmen concerned with industrial medicine (the Medic Inspectorate of Factories, the Mines' Medical Inspe torate, and the Ministry of Supply) is preserved leaving their chief doctors with the rank and sala (£2250) of principal medical officer Not only is the doctors' rank lower than that of the chief doctors the Ministry of National Insurance, the Treasury, th Colonial Office, and the Ministry of Pensions, bu their salary will be lower than that of those princip medical officers of the Ministry of Health who a to get £2500 "in recognition of their exception standing and responsibilities" It seems likely tha if the work and department of H.M Senior Medic Inspector of Factories had been transferred to th National Health Service, he would at least hav been given a place among the most senior of th principal medical officers of the Ministry of Health and the fact that, as things now stand, he bears fin medical responsibility in an independent departme should (one would suppose) entitle him to high rank than he would have had in the Ministry Aft all, even the most senior P M O in the Ministry

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[3] See *Lancet* 1951 ii 772

[4] The Habitual Criminal London 1951 see *Lancet* 1951 ii 1168

[5] Second interim report of the Social and Preventive Medicine Committee Royal College of Physicians January 1945

[6] Report of Committee of Enquiry on Industrial Health Service see *Lancet*, 1951 i 567

[7] See *Brit med J* Jan 12 1952, suppl. p 13

[8] See *Lancet* 1951 ii, 921

Health has the C.M.O. and two deputy C.M.O.s to help him out of difficulties.

Now it is obvious that the Treasury is in no mood for upgrading any department, and the Howitt Committee may reasonably argue that their proposals were meant to fit the existing state of affairs and not some future ideal. Nevertheless acceptance of these proposals as anything more than temporary would surely mean that *both* plans for developing the industrial health services have failed—both Mr BEVIN's and Mr BEVAN's. These services have not been made part of the N.H.S. as Mr BEVAN would have liked, and the Howitt Committee are evidently not thinking in terms of the independent development which was Mr BEVIN's aim. "It has been suggested to us," they say, "that industrial medicine has now become established as a special and important field", but by implication they dismiss this suggestion. The three departments dealing with industrial medicine "restrict their medical work in the main to the medical aspects of their statutory functions under the Acts which they administer," and the Howitt Committee do not even think it necessary that the chief doctors of these departments should have the prestige of direct access to the Minister and the permanent secretary—except in so far as the matters being dealt with are outside the scope of their statutory functions. The exception may be important, but there might be difficulty in saying, for instance, what are the statutory duties of the Medical Inspectorate of Factories, for no statute has ever defined them. The Medical Inspectorate is concerned with all health problems in factories and other places under the Acts. It has since 1898 (long before the Ministry of Health was formed) been in the forefront of investigation and research into occupational diseases, and its members have included outstanding doctors who, if they had confined themselves to their undefined statutory duties, would not have led the world in improving the health and welfare of industrial workers. The inspectorate seems to be a victim of the familiar principle that, the older a department, the less its officers are paid and the lower is their status.

An encouraging feature of the Howitt report was its proposal for interchange of doctors from time to time between Government departments and local authorities and between Government departments and the administrative offices of the National Health Service. There are very real advantages in our present system by which a number of more or less independent agencies are responsible for different parts of the joint task of preventing and treating disease, but to make such agencies work together successfully those administering them will need broad views, and they are more likely to avoid narrow ones if they have worked in departments and offices other than their own. What the Howitt Committee did not touch on was the possibility of Civil Service doctors holding clinical appointments in the National Health Service. Thanks largely to the wisdom of Sir WILSON JAMESON the Ministry of Health has latterly had the advice of clinicians working as part-time Civil Servants, and there has been at least one complementary case (admittedly exceptional) of an established Civil Servant holding a clinical appointment at a teaching hospital. If it is, as we believe, important to keep down the barriers so easily erected between different sections of medical work, there is a great deal to be said for some Civil Servants following for part of the day the clinical avocations of Dr Jekyll. Nowhere perhaps is the case stronger than for some H.M. Medical Inspectors of Factories, who could not even do their ordinary work—let alone their research—if they were not clinicians by training and temperament. The Royal College of Physicians properly described the Medical Inspectorate as consultants in the industrial health services, and recommended that the consultants and research workers in that service should have clinical facilities including beds. Short of this desirable development we should like to see a link forged between the Factory Department and the National Health Service by allowing a few physicians with suitable qualifications to hold a part-time post in each. Their experience in either capacity could be of value to them in the other, and the benefit of the arrangement would be all the greater if, as clinician, the doctor were on the staff of a teaching hospital. Unfortunately this common-sense plan, which has everything to commend it in practice, comes up against the argument that a doctor holding one post in the Civil Service and another in the National Health Service might on some occasion find his loyalties divided: in the morning his duty would be towards his patient and in the afternoon towards the community as represented by his Minister; and in a compensation case, for example, he could scarcely be impartial if he were the applicant's personal physician. But dual rôles are not so rare in our national or professional life that such situations are unprecedented; and where it seems that loyalties will be divided it is usually possible to withdraw from one side of the case. Difficulties of this mainly hypothetical kind loom large in the legal and logical mind, and perpetually stand in the way of new and useful developments. We commend to the Ministry of Labour and National Service JOHN HUNTER's sound if over-quoted advice: "Don't *think*. Try the experiment."

Mr Harry Crookshank, Minister of Health, regards the recruitment of nurses for mental hospitals as "one of the most difficult and intractable of our problems." Speaking at Lincoln last Monday he said: "Unlike other types of hospital the need of mental hospitals and mental-deficiency institutions for more staff is just as great now as when the National Health Service came into operation. Whereas in the first three years of the service there was an increase of 23% in full-time nurses and of 38% in part-time nurses employed in general hospitals in England and Wales, in mental hospitals the increase was only 2·6% for full-time nurses and 20% for part-time nurses, and in mental-deficiency institutions 2% and 31% respectively. The contrast is even more striking when one considers the number of student nurses," Mr Crookshank continued. "In these three years the number of student nurses in general hospitals rose from 30 003 to 36,284, but in mental hospitals there was a decline from 4935 to 4510 and in mental-deficiency institutions from 1267 to 1102. Despite restrictions on capital expenditure and the small increase in nursing staff, the number of staffed beds increased in the same three years by 9652 (6·9%) in mental hospitals and by 2309 (4·7%) in mental-deficiency institutions. Nevertheless over 2000 beds in mental hospitals and nearly 2000 in mental-deficiency institutions were out of use because of staff shortages." Mr Crookshank suggested that one of the main reasons for the staff shortage was the public's ignorance of the conditions in which mental patients are now treated and of the great progress that has been made in methods of treatment.

Because of the country's desperate economic plight a general expansion of the health service is impossible at present; but within the service the needs of the mental hospitals are among the most urgent.

Annotations

MEDICAL RESEARCH IN MALAYA

In the year 1900 a distinguished statesman and a legendary Colonial administrator—Mr Joseph Chamberlain and Sir Frank Swettenham—founded the Institute for Medical Research at Kuala Lumpur, Malaya, to initiate and sustain research into the causes of tropical disease, under the direction of "a medical man who has been specially trained for the work under one of the great pathologists", and they foresaw that "such an institution might prove of incalculable benefit to humanity" To mark the institute's fiftieth anniversary Dr J W Field, its director, and his staff have most fittingly produced a *Festschrift*[1] that will interest medical scientist and colonial administrator alike In it they commemorate their predecessors, take an inventory of the progress made, and attempt to visualise the needs and opportunities that lie ahead Its four hundred pages record a wealth of scientific data relating to some twenty or more diseases prevalent in Malaya In the more important of these, prefaced by a brief historical background, the narrative leads the reader with compelling interest, enhanced by many pleasing sketches, diagrams, and photographs, from the point at which the *institute* took up their study, through the hypotheses, false trails, and intermediate successes that punctuate and stimulate the progress of the research-worker, to the point that their unfolding had reached by the year 1950

The record is impressive Indeed, some of the investigations have had an important influence on medical progress beyond the borders of Malaya Dr Field and his associates pay generous tribute to the contributions to medical thought of a succession of medical practitioners in Malaya, from Sir Malcolm Watson and Dr W L Braddon onwards Vital contributions have come from sciences ancillary to medicine—namely, entomology, biochemistry, and zoology—all of which are represented on the staff of the institute Likewise Dutch workers in adjacent territories and, more recently, research units of the U S Army Medical Research and Graduate School, attracted by the facilities at the institute, have given inspiration and accelerated achievement The effective harnessing of these varied tributaries of progress has gradually transformed the institute from a small research laboratory of limited potential to a large medical research centre, to the great gain of the important but remote Colonial territory that it serves

For four years of war the institute suffered eclipse The desolation of stripped laboratories and dispirited staff made a profound impression on those who witnessed it But resurgence was swift, speeded by the Army Medical Services and Australian and Indian laboratories in matters of strains and equipment, and by the ready help of the directors of the Wellcome Research Institution, London, and of the Commonwealth Serum Laboratories, Melbourne, in providing many thousands of laboratory mice by air transit An allocation from the Colonial Office of research funds provided by the Colonial Development and Welfare Acts brought additional scientific staff and an expansion of inquiry in the fields of malaria and scrub typhus A guest research unit from the United States, under Dr Joseph E Smadel, sought and was freely given the facilities of the institute, and since 1948 has worked with spectacular success on the chemotherapy of scrub typhus and typhoid fever, and on related problems War dimmed the activities but not the influence of the institute Paradoxically, its effectiveness was never more strong For the garnered data relating to the understanding and control of malaria, nutritional disorders epidemic diseases in general, and the typhus fevers found considerable application in the Allied Forces, the internment camps, and the population of occupied countries in that distant theatre of war Especially was this evident in the case of malaria, wher the work of *Wallace and of Field* (1936–38) on the hig suppressive value of mepacrine served as the starting point of the splendid work of the Australian malariologists, led by Fairley, but for which the inroads of malar might have jeopardised the success of the Allied campaig

In reflecting on the future, the authors note the progressive decline in the incidence of many diseases such a beriberi, plague, cholera, and the dysenteries, *and in th* mortality-rate of malaria, pneumonia, and scrub typhu But they see a formidable challenge ahead, from tuberculosis, filariasis, yaws, malnutrition and its attendan anæmias cirrhosis of the liver, the almost virgin field virus diseases, and the control of rural malaria T sustain a staff able to meet this challenge they hope f much from the post war trend of increasing collaboratio with research units from overseas, regardless of race frontier , and they welcome the newly establishe Colonial Research Service Graduates from the ne *University of Malaya will participate increasingly*

Study of this splendid *Festschrift*, surely an "amp page, rich with the spoils of time," will leave all wh elect to serve the institute with the conviction th "their lot is cast in a fair ground," that "they have goodly heritage"

TREATMENT OF BRAIN ABSCESS

BRAIN abscess is an extremely dangerous complicati of certain infective processes , and diagnosis, localis tion, and treatment all make exacting demands clinical skill The intracranial pressure may rise rapidly that the signs and symptoms of increased pressu dominate the clinical picture , and sometimes th makes clinical examination difficult Yet in the *cases there is no suitable substitute for physical examin* tion Thus, the characteristic motor signs may poi to a cerebellar abscess, while an upper quadran defect in the field of vision is eloquent evidence of temporal lobe location

Chemotherapy has dramatically improved the pro nosis , but it has also brought fresh problems as regar the best surgical approach Jooma, Pennybacker, an Tutton[1] have lately collated the experiences of th neurosurgical units at Oxford, Edinburgh, and Ma chester with a total of 295 cases Since the introductio of penicillin the mortality of brain abscess in these uni has been reduced from 53 to 27% , penicillin injected into the abscess cavity, intramuscularly, an if necessary into the cerebrospinal fluid The absce may be dealt with by one of three methods Firs it may be aspirated with a needle, and penicillin inject along with a radio opaque substance for radiograph control , secondly, it may be drained surgically throu a tube , and thirdly, it may be excised completely like tumour, with or without previous aspiration Joom and his colleagues find that mortality is lowest wi excision , but acute fulminating cases in which abscess capsule has formed cannot be treated in th way, and so the figures for the various methods of trea ment are not comparable with each other It seem clear that successful aspiration leads to less cerebr damage than does excision, but it carries an increase risk of recurrence, abscesses sometimes have sever loculi, not all of which may be drained by aspiratio Of 88 patients treated by aspiration or drainage who le hospital alive, 7 subsequently had recurrent infection the same site On the other hand, in none of the patients who survived excision of the abscess has infectio recurred at the same site

With regard to the incidence of subsequent epileps this seems to be much the same with each method, nearly 50% of all cases a tendency (often slight) to epilepsy became manifest. This figure is much the same as those for brain wounds after both the first and the second world wars and it seems to have been little influenced by the vastly cleaner wounds of the second war[2] Jooma and his associates advise the administration of anticonvulsants in all cases for several years; but some clinicians will prefer to wait till a fit has occurred before starting such a routine

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[1] Studies from the Institute for Medical Research Federation of Malaya no 25 Jubilee Volume Kuala Lumpur 1951

[1] Jooma O V Pennybacker, J B , Tutton G K. *J Neur Neurosurg Psychiat* 1951, 14 308

From this study it is evident that the best method of treating each type of case is not always obvious but the figures contained in it will help the surgeon to assess the advantages of each method more confidently than has hitherto been possible

A NEW MYCOBACTERIUM

OF all the acid fast bacilli the medical student has sure knowledge only of the tubercle bacillus, the smegma bacillus and perhaps that unidentifiable organism found by the pioneers in water taps and the mouthpieces of wind instruments So many and urgent have been the problems presented by the few well recognised pathogenic mycobacteria that their relatives who cannot be implicated in human or animal disease have been relegated to small print and examination questions. Today however bacteriology is getting its second or third wind and once again prying eyes are looking beyond the few dozen species of bacteria known to be pathogenic to explain the phenomena of infective disease

Some time ago we referred to the discovery in Australia of a mycobacterium found in chronic ulcers of the skin, which was pathogenic to mice and grew most profusely at 33°C[3] Now a similar but not identical organism is reported from Sweden[4] This, too came from lesions of the skin described as chronic, papulous, and ulcerating Some of these at least have followed minor scratches in the swimming bath and the same organism was found in scum on the side of the bath Seen in section the granulation tissue was tuberculoid" and in one a few acid fast bacilli were found. From three ulcers out of twenty culture at 31°C produced the new bacillus It grew slowly at 22°C and not at all at 37°C; 5–10% glycerin added to the fertility of the medium In mice it usually produced widespread abscesses and death in rats infection of the lymph glands without signs of disease Intraperitoneal injection in the rabbit caused in some cases a caseating granuloma of the scrotum and application to the rabbit's abraded skin resulted in lesions similar to those found in man Except for local abscesses at the site of injection guineapigs seemed immune to infection and so did chickens The injection of an autoclaved culture into tuberculin positive people produced a tuberculin like papule which ulcerated

Few procedures are so standardised among the nations as the niceties of bacteriological technique and we can accept the statement that the Australian and Swedish mycobacteria are similar but not identical They have a similar origin and they grow best at about the same temperature but they differ in the damage which they do to rats and we are told, in the characters of their growth on artificial media. We have doubts whether either yet deserves to be elevated to the status of an organism specifically pathogenic to man The literature of the dark ages of bacteriology teems with reports of B this and B that which since there was then no collection of type-cultures, it is unlikely that we shall see again Acid fast bacilli were found in gangrenous lungs, in nasal secretions and in the urine of patients with syphilis Some early investigators claimed that the better known kinds which they found in butter and grasses and dungheaps could be converted to tubercle bacilli by animal passage. Others have failed in this attempt, but there is no doubt that some at least of the 'saprophytic' acid fast bacteria can produce lesions in guineapigs not much different from those caused in rats by these new species.[5] It was the failure to recognise that pathogenic and saprophytic are relative adjectives which led so many of the pioneers into trouble Today we have learnt caution and must admit that we do not know whether many of the organisms commonly found in diseased tissues are active enemies of man or are merely taking advantage of nutritious pastures of others making Anyone who examined the flora of war wounds must have blushed from time to time at his boldness in putting his blind eye to the microscope when faced by organisms of which he knew neither the name nor the lethal potential The evidence of those who study food poisoning suggests that salmonella and staphylococcus are not the only dangers lurking in the stew[6] So successfully have we used our blood agar and "McConkey" and the incubator at 37°C that we may forget that there are organisms such as these new mycobacteria which will not flourish in that soil and climate. It is too easy to assume that because an organism does not grow it is not there—or at any rate that it does not matter To examine a gram stained smear from a jungle sore or a faecal scybalum is a lesson in modesty to any bacteriologist.

We have no doubt that these mycobacteria from Australia and Sweden are species new to science. That they all arise from the same sort of origin suggests that they may have a specific pathogenicity for man but equally that they were found in so small a proportion of the ulcers examined in Sweden suggests the reverse. They will certainly receive attention in many lands at this moment we can almost hear the clamant demands for incubators to work at 31°C

AQUA PURA

THERE are occasions when mayors, deans, provosts presidents, and panjandrums praise the corporate body that they represent in words so fulsome that we listen with tolerant disbelief As far as we know the scientific staff of the Metropolitan Water Board limits its trumpetings to a paper bound report appearing not annually but as material of sufficient importance accumulates. The thirty fourth of these covering the years 1939–46[7] presents much of interest in a modest format

The supply of drinkable water to eight million Londoners under aerial bombardment is rightly described as a military operation Incoming supplies such as the New River filtration plants and service reservoirs were all damaged from time to time Fracture of the distributing mains resulted from every air raid and contamination of these from adjoining sewers was usual To meet such troubles the board made two changes in their accustomed procedures So much use either continuous or intermittent had to be made of potentially contaminated supplies that prechlorination of raw water became accepted practice Among the sources used was a tributary of the Lee in which paratyphoid bacilli have lurked since the Epping epidemic of 1931 That the board drew water from this source with a clear conscience and without known ill effects is testimony to the value of this process. The other innovation was made necessary by the contamination of the fractured mains all of these when mended or replaced were flushed out with chlorine at 10 p p.m and special plant was designed for the purpose After every raid supplies had to be diverted from places to place, and, on occasion, the needs of domestic consumers and hospitals had to be met by water-carts

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[2] Russell W R *Ibid* p 35

[3] MacCallum, P Tolhurst, J C Buckle, G Sissons H A *J Path Bact* 1948 60 93 See *Lancet* 1948 ii [illegible]

[4] Norden, A Linell F *Nature Lond* 1951 168 8[illegible]6

[5] Lehmann K B Neumann R O Determinative Bacteriology New York 1931 p 151

[6] *Mon. Bull Min Hlth P H L S* 1950 9 148

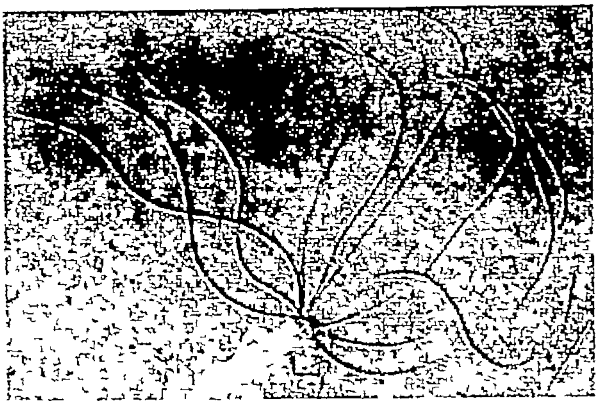
[7] Metropolitan Water Board: 34th Report. London: Staples Press Pp 102 15s 6d

Even the modesty of this report cannot hide the immense forethought which had been devoted to the dangers of war Air raids gave us all some surprises, but the M W B seems to have had less than most We do not know how many typhoid carriers are loose in London, but there can be few aggregations of 20,000 people which do not harbour one or more One was enough to cause 323 infections in Croydon,[8] and the possible havoc of such an epidemic in a London with water and sewerage systems disrupted by high explosive was sufficient justification for the thorough measures adopted Close reading is needed to find the statement that, despite damage and personal danger to a devoted staff, bacteriological examination of London's water showed a higher standard in these years than ever before As far as we know, no case of water-borne illness occurred in the area served by the board

The rest of the report is of more specialised interest for the sanitary engineer and the bacteriologist But we are grateful for an authoritative statement on the domestic "tank in the roof" and its dangers to health If it has a well-fitting cover there is no danger, if it has not, the dangers are very few—although a dead mouse does not improve the flavour It is, at any rate, the responsibility of the householder and not of the M W B

ELECTRON MICROSCOPY OF SPERMATOZOA

ONLY a small part of the territory which lies open to the electron microscope has yet been explored The advance into this new world has been slower than we might have hoped—not from any limitations of the instrument itself, but rather because the preparation and mounting of specimens have proved difficult Sections must be very thin (less than 0 1 μ) and, since the microscope operates at a very low pressure, completely dry Techniques to surmount these obstacles, and elegant methods of improving the photographic results have been devised Particularly effective is the golden coat given to a specimen by bombarding it with atoms of the metal



In the photomicrograph this coat appears as a picture in relief, faithfully reproducing the contours beneath

Using this and other methods Bayle and Bessis,[9] with their microscope in Paris, have taken some remarkable photographs of human spermatozoa The picture which we reproduce shows what is called the terminal filament or end-piece of the tail of the sperm, it consists of about 10 fibrils, each 1–2 μ in length and 50–60 mμ in thickness This structure is more usually described as the continuation of a single axial filament which runs the length of the tail The fibrils emerge from the tail, and in cases, though not in this picture, they come together again to form, in the authors' phrase, an appendage of rigid appearance Sometimes the envelope which surrounds the tail seems to have been broken at the origi of the terminal filament and its remains can be seen scattered about The fibrils are probably continuous with those which Bayle and Bessis have been able to show within the tail itself by breaking open the envelope with a digestive ferment It is possible to see the termina filament with an ordinary optic microscope unde favourable conditions, but no precise details can b made out

Bayle and Bessis do not tell us what they think ma be the function of this leash of fibrils Does it in fa exist in the living cell or is it the result of damage as th envelope débris might suggest? Otherwise, an obvio and engaging theory is that the fibrils add to the pr pulsive power of the tail We would not deliberatel promote further dispute about flagella,[10] but surely her is good ground for another lively engagement betwe Professor Pijper and his opponents

WARMING THE FROZEN LIMB

IN treating patients with chilled or frozen lim clinicians are often led, by theoretical arguments an consideration for the patient's comfort, to apply modera warmth, commonly the injured limb is elevated an exposed to an air-temperature of 15–18°C, while th rest of the patient's body is warmed[11] Clinically there little firm evidence to show whether such a procedure less or more beneficial than rapid warming That chilli is not advisable was shown by Davis et al.,[12] who treat frostbite at high altitudes by (a) continued chilling 2–5°C, or (b) exposure to room-temperature, and th concluded that continued chilling resulted in the great loss of tissue

Experimentally Pichotka and Lewis[13] have found th rapid heating is better than moderate warmth The shav legs of rabbits were frozen for half an hour at −10°, −1 and −15°C, and were then either (a) thawed for 5 minutes in a waterbath at 42°C (the normal blood-heat the rabbit is about 39°C), or (b) left to warm gradually room temperature The animals in which the limbs we rapidly thawed seemed to have greater pain, but th general condition was better, œdema appeared mo rapidly but was less severe, and the limbs, unlike tho in the other group, were not paralysed Rapid thawi was also associated with less cutaneous necrosis (b the difference in the extent of muscle necrosis w less conspicuous) Pichotka and Lewis deduce th primary damage to the vessels cannot be the cau of local gangrene, and that the "thrombosis" of lar parts of the subcutaneous vascular system, which w often observed during the development of superfic necrosis, must therefore be secondary Kreyberg[14] an Greene,[15] differ from this view only in maintaining that t vessels are not thrombosed but obstructed by long colum of solidly packed, conglutinated red blood cells. Th stasis is thought to occur in the recovery period, an possibly it may be prevented by rapid re warming

There is thus evidence that in man continued cooli is dangerous and that in animals rapid heating is bett than exposure to air temperature. The need now is f convincing clinical trials to establish, once and for al whether in man the additional discomfort from deliber re heating is counterbalanced by slighter tissue damage.

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[8] See leading articles *Lancet* 1937 ii 1257 1938 i, 443, 1938, ii 1366 Annotation *Ibid* 1939 i 998

[9] Bayle H Bessis M *Pr méd* 1951 59 1770

[10] See *Lancet* Jan 12, 1952, p 88

[11] Learmonth J R Ungley C C *Proc R Soc Med* 1943 36, 51

[12] Davis, I, Scarff J E, Rogers, N Dickinson, M. *Surg Gyne Obstet* 1943, 77 561

[13] Pichotka J Lewis, R D *U.S Armed Forces med J* 195 2 1293

[14] Kreyberg L *Lancet* 1946, i 338

[15] Greene, R *J Path Bact* 1943 55 259

Special Articles

INPATIENT TREATMENT OF ADOLESCENTS WITH PSYCHOLOGICAL ILLNESSES *

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PSYCHIATRISTS who see adolescents as outpatients or in child guidance clinics are familiar with a host of maladjustments psychoneurotic reactions, personality disorders and psychotic developments. Psychotic adolescents requiring some form of physical treatment, or so disturbed as to need urgent hospital care are properly admitted to a mental hospital ward among adult patients, but correct disposal of other young patients who need psychological investigation or treatment in hospital is less obvious

This became clear in a discussion on the inpatient treatment of psychotic adolescents by the medical section of the British Psychological Society in 1948 In adult wards such patients tend to form an uneasy minority usually resented by the older patients Cameron (1950) drawing on his experience of 100 adolescents admitted since 1945 to the adult wards of the Maudsley Hospital said:

> ' Males (adolescents) are active self-assertive difficult to control, an irritation to the adult sick, and themselves subjected to unfair snubbing and repression by older patients. Female adolescents do not create a problem, but the danger to themselves is probably greater Adult women patients include a large number who are depressed hypochondriacal preoccupied with physical functions or disease morbid in their attitude to sex and childbirth

Such youngsters are equally unsuitable for placing among prepubertal children apart from the undesirability of mixing the sexually mature with the sexually immature their influence would be disruptive of discipline.

INPATIENT UNIT

The Bethlem Royal Hospital and the Maudsley Hospital in 1949 formed, for the investigation and treatment of adolescents, two special wards one with 16 beds for boys, and the other with 16 beds for girls, between twelve and sixteen years of age Some elasticity was allowed in these age limits but usually boys and girls aged seventeen or more were happier among adults.

These numbers have proved easy to handle higher totals would have been more difficult because an intimate knowledge of each patient is essential Before admission every patient is carefully assessed to determine his or her suitability for inclusion in the ward group Thus of patients with aggressive qualities or a behaviour problem up to 3 out of a total of 16 in each ward can be accommodated A higher proportion has led to their dominating the group and spoiling its harmony Again to admit at one time for instance too many with pronounced homosexual tendencies might be regretted

When the unit was planned there was no guide except useful practical experience gained with younger patients in a children's ward (Cameron 1949) In addition previous experience in adult wards had proved that adolescents would require as much investigation and treatment as any group of adult patients There had been some forebodings when the supposed proclivities for riotous and destructive behaviour of youngsters were considered Curran's (1939) account of his unit at Bellevue New York might have confirmed such fears but it provided for 40-50 boys, of whom about 70% were referred from the courts and none were permitted to remain for more than *four weeks*. The potentialities of small numbers were hardly comparable.

RÉGIME

A régime has been aimed at which is helpful to the anxious, inhibited or (on the other hand) aggressive patient, in addition to any individual investigation and treatment A happy atmosphere is needed, with reasonable freedom for individual peculiarities and interests. Nevertheless a measure of discipline promotes the comfort and well being of most young people The physician in-charge needs to steer the whole ward—staff and patients—along a tolerant middle course As in any reasonable home there is an ordered routine for bed and meal times, and so on which is insisted on due allowance being made for the obsessional patient who may always be late Without limits of freedom, adolescents become overtly anxious they still need the security given by self assured but intuitively sympathetic adults in charge of them Even so some small upset has led to a ' ganging up ' and they have quickly whipped each other up into a destructive mischievous, and insecure mob Sensing disapproval, and with guilty anxiety, they have tried to provoke those in charge to retaliate for enormities they can soon commit Firm undisturbed, and friendly authority must step in restore order and if necessary do justice by some nominal punishment such as the removal of privileges for a time This has usually quickly promoted security to aggrieved patients and staff and all can settle back

Adequate room indoors and out for activity including healthy ' horseplay ' has been important damage can thus be kept well within bounds The sexes are segregated in their own wards but meet on supervised occasions. Similarly they are kept away from adult patients Neither ward, placed one above the other has shown excessive interest in the other a few notes are passed with improvised fishing lines a few sentimental thoughts may occur but girls, on the whole, indulge in phantasies of more mature men and boys consider the wardmaid more exciting for their dreams, or fall in love with purest adoration for some pretty nurse

Constant and varied occupation is needed for boundless energies. Reading matter and many well known games are in constant demand but interests come and go with bewildering change of fashion; all the games are kept and handed out on demand by the nurse in-charge

More formal occupations include regular occupational therapy daily physical exercises and organised games. Skills can be promoted, and the more timid patients tactfully encouraged Enthusiasm however, again fluctuates, and a large group may inexplicably dwindle and excuses be made; with patience interest may in due course reappear

Formal education which is often most important for this age-group, who may have missed months of schooling and may be handicapped by backwardness or various defects has been provided on an adequate scale with regular and individual attention for the needs of each patient. It is hoped to gain much information on the education of the maladjusted adolescent

All these activities and others when available are coördinated into a fairly busy daily programme suitable for them

STAFF

The staff includes a physician in-charge for each ward who supervises all aspects administrative and clinical and who takes responsibility for any unwelcome decision A registrar with adequate training in child psychiatry as well as adult psychiatry has the personal and intimate relationship with the patients so necessary for psychotherapy With responsibility so divided, nothing need upset his relationship with them

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* The substance of this article was presented to the psychiatric section of the Royal Society of Medicine in December 1950 as part of a symposium on the Inpatient Treatment of Adolescents

A psychiatric social worker is responsible for the adjustment of the outside environment of the patients She will arrange for their care after discharge , a suitable school, hostel, or work may have to be found She has kept close touch whenever possible with the parents, who often need help with their own emotional problems , and they must be prepared for considerable changes in the behaviour and outlook of their child Much gained in hospital will later be lost, if this is not done

A mentally and generally trained nurse takes charge of each ward , there is a male nurse for the boys, because a woman might not be able to preserve order with this age group The rest of the nurses are female for the girls' ward and of either sex for the boys, since women soften any tendency to regimentation and in some cases provide excellent "mother figures" Training in mental nursing is important , used to disturbed adults, the nurses are more likely to be objective in dealing with emotional disturbance in adolescents , and less likely to misunderstand aggressive behaviour

All these members of the staff, including a psychologist and the school teachers, each with something to contribute, cooperate to form a team Regular meetings are held, and observations are pooled towards diagnosis and the furtherance of treatment After discharge the patients and their parents are followed up , often much supervision, psychiatric and social, is required to ensure continued adjustment and stability

ADMISSIONS

Requests for admission have arisen when investigation of a puzzling case was considered necessary, or more often when a patient could not be handled at home Among delinquents it was the presence of overt psychoneurotic symptoms, or some suspected psychopathological disorder, that usually led to admission

The resulting clinical material, about 120 patients admitted in two years, has been most heterogeneous and covers a wide if somewhat circumscribed portion of the psychiatric field In spite of the diversity of the cases, and because all the patients were adolescent, certain fairly uniform patterns of behaviour commonly emerged These are well known and chiefly involve psychosexual development and maturation and emancipation from parental and childhood ties Thus, in many of these youngsters, as in normal children, there might be behaviour which in those of maturer years could be considered abnormal These included ambivalence of ideas and feelings , sudden enthusiasms but with failure to sustain interest , eroticism, with minor sexual anomalies or fleeting perversions , rebelliousness and aggressiveness, perhaps combined with a clinging dependence , sociability followed by sulky solitude These bewildering youthful characteristics lie in normality or on its borders In some patients they predominated , in others, they appeared to be less important and might only colour the picture In some psychotic patients they could hardly be seen, although, if a psychosis appears at this time, adolescence in itself must be regarded as an important intrinsic ætiological factor

Emotional disturbances occur when any factor, or combination of factors, interferes with a healthy response to the increasing demands of life, or with the casting off of old emotional ties In these circumstances abnormal psychoneurtoic syndromes conduct disorders, or both may appear About three fifths of these patients showed these in one form or another perhaps withdrawal or regression with insecurity and doubt , reactive depression , anxiety, overt or hidden hysterical states , or evanescent obsessional symptoms Combined with them, or alone, there might be the whole range of conduct disorders aggression, rages stealing lying, truanting, arson, and so on Such may have led to the patient's appearance in court

More ominous complexes of psychotic symptoms have occurred in a further fifth , rarely they were manic depressive reactions, but in most they were schizophrenic in type, or occasionally schizo affective Some were diagnostically clear cut , but a few, most difficult to assess, appeared as crises of psychotic intensity after puberty , perplexity, bewilderment, and delusions, supervening on some acute emotional stress, suggested a confusional state as much as schizophrenia Examples of these have been described by Warren and Cameron (1950)

Finally, the remaining fifth of the patients showed a variety of psychotic or psychoneurotic illnesses, behaviour or severe personality disorders, which dated far back into earlier childhood , hence adolescence could only be said to have supervened in their course Few patients, even in the majority where a breakdown occurred in the prepubertal or postpubertal years, were free from evidence of slight or severe emotional disturbance in earlier childhood The clinical picture showing in adolescence was seldom new, and the background of childhood difficulties was important

The ætiology of the illnesses of these patients was equally diverse Adolescence, closely bound up with the symptoms, has been emphasised, but many other factors had played an integral part in their evolution Som patients had organic disease affecting the nervous o other system , epileptic patterns were not uncommon and any of these could render a child of any age mor incapable of meeting new demands Physical an intellectual development, when much advanced o retarded, can be of importance, as also educationa attainment Some youngsters were very backwar educationally and had found difficulties at school o elsewhere Finally, their social circumstances were ofte most deleterious, materially or emotionally , significan trauma was not rare in their personal histories, makin an adverse environment of the highest ætiologica importance These factors and others may all hav played their part, and a broad socio psycho biologica view has been essential for the full appreciation of thes patients' conditions

FAMILY SITUATION

The home with the parents plays an integral part i normal emotional development and in the ætiology o any emotional disturbance in earlier childhood Similarly they are involved intimately in many aspects of norma emotional development during adolescence , they canno be ignored when a psychologically disturbed youngste is assessed and treated

Admission of an adolescent to hospital leaves thes important figures of home behind They may too easil be ignored in any scheme of treatment, particularl when their ætiological importance is not obvious, a perhaps in a psychotic patient Many adolescents wit psychoneurotic symptoms tend to improve in a deceptiv manner after admission to the neutral ground of hospital their discharge home may inevitably end in a relapse unless their conflicts and difficulties over their parents and home have been resolved

Creak (1950) remarked

> "It is very important to be sure that in the calm regularity of an ordered institutional life there is real progress in emotional relationships, and in forging emotional security
>
> It is easy to be quiescent and passive and to overlook the need for social opportunities which reproduce the earlier conflicts which the adolescent has had at home with the parents Until these are worked out, it is not possible to make any progress"

This takes cognisance of the patient and his treatment in hospital , careful attention to, and perhaps treatment of, the parents and those at home may also be important

Their neglect may equally lead to further breakdown of the patient after discharge although in contrast to younger children adolescents are approaching the stage of maturity when their parents cease to be such significant figures. If the emotional ties of immaturity have been cut they may sometimes safely be discarded

These patients circumstances at home showed obvious faults in 41% such faults were further considered in 23% to be gross enough to have been detrimental to healthy development Their exact psychopathological significance could be judged only by the full examination of each case but their social importance in general was clear they needed careful attention both during and after inpatient treatment to ensure a successful outcome for the patient

Parental emotional attitudes towards the patient revealed a high frequency of abnormality—e g over anxiety, rigidity hostility, or rejection Such were regarded as of considerable causal importance to the adolescent s breakdown in 40% and of some importance in a further 27% They occurred not only in psychoneurotic illnesses but also in some patients with organic states

Treatment had to include help to these parents, especially the mother A few mothers were so emotionally disturbed as to need formal psychiatric assessment and treatment indeed admission to hospital of an adored son has precipitated the mother s breakdown or paradoxically, the clinical improvement of the child has done so; more than one patient has been removed by parents because of the anxiety that admission produced in them

The following cases are illustrative of these points

Case 1 —A postpubertal boy aged 14 of high intelligence was admitted because he had refused for a year to go to school had run away from home on two occasions, and showed aggressive behaviour chiefly directed against his mother

His father was an easy going working man who preferred the boy s sister aged 16 and took little notice of him His mother intelligent and highly strung had escaped from an unhappy home into what was to her an unsatisfactory marriage She had enjoyed a close relationship with her son treated him more like an adult and demanded the understanding from him which her husband could not give His illness signalled his rebellion from her

After his admission, while he settled down reasonably well she became increasingly anxious and depressed She finally broke down said her son had changed so that she could not have him home and talked of leaving her husband She has had to be treated as an outpatient in her own right

Case 2 —A postpubertal girl aged 14 was admitted with a long history of extreme frequency of micturition with severe abdominal pain. This had more or less confined her and her parents to the home Previous investigations elsewhere had proved its hysterical nature Psychotherapy in hospital revealed that her symptoms were related to phantasies of pregnancy a belief that she had become pregnant by a bad father she had in a previous existence Her condition improved but her overprotective anxious, and aggressive father became increasingly reluctant to accept this and became paranoid in his attitude towards the hospital and the doctors who treated her After declaring that she could only be kept in hospital if not treated as a nervous case he removed her against advice

TREATMENT

Treatment in so mixed a group of patients has been varied and included the well known physical methods The unit has in addition allowed observation in a controlled setting and unusual opportunities for psychotherapy The situation may contrast with that in a ward among older people because the patient is among contemporaries there is more of interest to do and adults in charge are more attuned to the possibilities of their behaviour The therapeutic effect of this can hardly be measured, but it appears to be beneficial to nearly all those with psychoneurotic or behaviour problems. It leads to a cushioning of anxiety and conditions helpful for a more direct psychotherapeutic approach are promoted for those who need it. Aggressive behaviour does not have such repercussions and this helps to build up 'rapport

In comparison with outpatient treatment these patients do not return between each interview to the family circle where with parents and siblings often involved in the upset there is ample opportunity for all to whip each other up into an increasing state of overt anxiety and aggression Separation by admission may be the only course in such cases For instance a boy, aged 14 was admitted because he had become increasingly depressed anxious and aggressive to his mother and his stepfather and was now running away to stay out all night The psychodynamics of this case were difficult to probe and the situation was getting out of hand but admission brought an immediate amelioration and facilitated further investigation

Adolescents housed together form a dynamic group with those in charge of them The internal stresses of this group are difficult to assess but they are apparent to the physician[1] who is an important figure in it. These youngsters have to sort themselves out one with another some perhaps to become leaders of a small section and others to try to remain isolated—not easy in a community life They are often in competition with each other intellectually and physically and for all these reasons there is need for constant watchful care by the staff to keep a balance between one or another in the light of each personality Such a situation can have a profound and beneficial effect on a youngster who has always been the centrepiece of his home perhaps the only child or the spoiled one The previously rejected child is carefully no longer rejected by those in charge of the ward the schizoid or solitary patient cannot retire from all contacts as he may do at home The aggressive patient is liable to find another who will hand back more aggression than he metes out.

Some patients stay for months, and a few for more than a year and maturation is taking place all the time Hence when discharge comes the patient has acquired more education in a wide sense, and some corners will have certainly been rubbed off All these rather indefinite but important sides of treatment whatever the illness that led to admission cannot be discounted

Some patients require no further treatment than this general régime and attention to the social situation Most of those with psychoneurotic and behaviour problems, however require individual psychotherapy as well for a successful outcome. Some writers emphasise its difficulties with adolescents a not uncommon experience in an outpatient interview is to meet a patient who mute except for an occasional whispered yes or no allows no contact to be made Again anxieties are easily raised and these may lead to more difficult behaviour at home or the cutting of appointments The reactions of adolescents are not so controllable by the therapist as those of adults nor may they be handled by parents as easily as in younger children

In hospital some of these difficulties may be eliminated or lessened Rapport can be built up between therapeutic sessions and resulting anxieties are easier to manage Practical experience of adolescent mechanisms and modes of thought by the therapist lessens his difficulties so most adolescents can be handled with techniques similar to those used with adults For younger patients, less able to speak their thoughts such projective techniques as painting may be helpful and suitable tuition may overcome a tendency to paint rigid stereotyped pictures Again some problems can be intuitive divined by the therapist and their general discussion without direct reference to the patient may bring about alleviation There remains, however, a minority of patients who, although often happy and accessible in a social situation, remain tense and silent when any attempt is made to explore their problems Such may need three or more months' patient endeavour to build up a sufficient relationship for progress to be made One such patient, resistant even to these protracted efforts on the part of the therapist, successfully worked through his difficulties in a therapeutic group, by projection, so to speak, on to the other members of the group

Adolescents who have problems of behaviour, and may be delinquent, may give rise to special problems Such a child is apt to get at loggerheads with all the other patients, and care may need to be taken not to allow him also to be at enmity with the staff He may regard himself as fit if unhappy, and, puzzled by admission to hospital, he may resent any attempt to explore his problems An unusual degree of patience may have to be exercised over mischievous or aggressive qualities, it is fatal to successful therapy to antagonise him approval and security have to be fostered, and any cri that develops needs prompt and painstaking manag ment Not all delinquents have been found suitable intensive psychotherapy, and careful observation investigation over a period of time is necessary to reach a mature decision on this point Even then a long period may be necessary to build up empathy sufficient for it, and progress may mean the unleashing of considerable anxiety On the whole, confirmed delinquents have proved the toughest propositions to handle, they have only been equalled in other ways by those with severe obsessional neurosis

My thanks are due to Dr Kenneth Cameron, who shares the responsibility of this unit, and whom I have consulted on many matters concerning my account of it

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Reconstruction

INDUSTRIAL HEALTH SERVICES*

The Medical Inspectorate and Their Needs

THE medical profession and the public are awakening to the importance of industrial medicine, and many organisations and individuals are engaged in planning the industrial health services of the future The many official and other reports issued in the last ten years all criticise, in varying degrees, the present arrangements Yet as long ago as 1915 E L Collis had already called attention to the tardy development of the industrial health services Referring to Greenhow's brilliant investigations in the 1860s into the effect of occupational dusts on the lungs, he said

> " Why work so well started was then allowed to lie dormant for so long while other aspects of public health were being strenuously developed by medical officers of health with inspectors of nuisances appointed for every town and district, reinforced now by a battalion of tuberculosis officers, is astonishing "

In considering the reasons for this unequal growth of the two branches of preventive medicine it should be remembered that the public health services were developed under the local authorities, the doctors being given a large measure of autonomy, while the industrial services were controlled by the central Government, in which policy-making on all subjects is in the hands of lay administrators It is possible that this difference in administrative practice explains to a large extent the unequal development of the two services

HISTORICAL BACKGROUND

The history of the industrial health services is bound up with that of the Factory Department of the Home Office, transferred in 1940 to the Ministry of Labour and National Service This department was created in 1833 primarily to control the hours of employment and to continue the education of young persons and to enforce health legislation (It is interesting to note that it was the precursor of the Ministry of Education) It was at first only concerned with textile factories, but later its sphere of influence was extended to all factories With the increased mechanisation of industry, accident prevention tended to overshadow the department's original functions of looking after the welfare and education of the young, this preoccupation with accidents has persisted to the present day

The department's interest in health was increased when, in 1896, the first and only Medical Chief Inspector of Factories was appointed This was Sir Arthur Whitelegge, who had been medical officer of health for Wakefield The reason for his appointment is not now known but in 1898 he was instrumental in having Dr T M Legge (later Sir Thomas) *appointed as the first* Medica Inspector of Factories This appointment had far reaching effects, because Sir Thomas Legge proved to b a man of outstanding ability, and his work as a pionee has set the pattern for investigations into occupationa ill health, not only in this country, but also for the res of the world Incidentally, he gained for the Factor Department a world-wide reputation But when Si Arthur Whitelegge retired, a non medical Chief Inspecto was appointed, and the Medical Inspector continued t work under him It is clear that an opportunity was los at that time to build up a really strong and progressiv medical department, independent of the lay Chief Inspector, and with the requisite status and authority Th *paramount authority of the lay inspectors over healt* matters has been crystallised in successive Factorie Acts The Factory Department has been taken as model in building up similar departments in othe countries, and unfortunately in many instances it ha been copied too slavishly by arranging that the engineer and other laymen control the doctors The Ministry o Fuel and Power in this country has taken the Factor Department as a model in this respect

STRUCTURE OF FACTORY DEPARTMENT

The Chief Inspector and the 5 Deputy Chief Inspecto control both the general staff and the specialist branches The inspectorate numbers about 412, of whom 365 ar engaged on general duties, and the remainder are medica (16 with 3 vacancies), electrical (14), and engineering an chemical (17) inspectors There are also 21 cantee advisers and 4 inspectors of textile particulars

The country is divided into 12 divisions (of whic Scotland is one) each in charge of a superintendin inspector A division contains 6–10 districts, each in charge of a district inspector who has junior inspector working under him

The Engineering and Chemical Inspectors are al stationed in London and usually act as specialist advisers in one particular branch of engineering or chemistry The Medical Inspectorate, on the other hand, investigates and advises on the health aspects of all factory work

Every part of industry has a health problem Even *accidents, on which the lay inspectorate concentrates* have their medical problems Indeed, it can be said that the Factory Department's prime function is to deal with the health of the workers. Yet for the whole industrial population of England, Wales and Scotland there is only a complement of 16 Medical Inspectors—and among these there are at present 3 vacancies.

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* Abridged from a memorandum prepared by the Institution of Professional Civil Servants

Of the 13 doctors, 3 are stationed at headquarters 2 deal with divisional work in London and the remainder are stationed in the various divisions throughout the country They are responsible to the Senior Medical Inspector who in turn reports to and is subject to the orders of the Chief Inspector and the 5 Deputy Chief Inspectors The Senior Medical Inspector is in effect the chief medical officer for industrial health for England, Scotland, and Wales, and his sphere of influence is therefore larger—in area at least—than that of the chief medical officer of the Ministry of Health But his rank and salary are that of a principal medical officer and it is probable that they have been deliberately kept low so that they shall not rival those of the Chief Inspector

The medical branch of the Factory Department has long felt that excessive lay control has retarded the development of the industrial health services If there had been medical control of the industrial health services, there would not be now only 13 Medical Inspectors to deal with industrial health problems of the entire nation Further, each Medical Inspector would not be expected to cover a large area of the country without an adequate staff working under him At present the only person to whom the Medical Inspector in the divisions can give an order is his clerk shorthand typist

The anomalous position of a Medical Inspector in a division becomes clear when his status is compared with that of a medical officer of health The M.O.H. has under his immediate control a medical nursing and lay staff varying in size with the population of the borough If the M.O.H. needs information about the sanitary conditions in any house or the circumstances of any patient suffering from a notifiable disease, he can go himself to obtain it but he usually sends one of his trained staff to make a preliminary investigation He can then decide whether or not the matter warrants his personal attention The Medical Inspectors who have the tacit though not the legal responsibility for the health of the workers in the factories in their areas—each of them much larger in area and population than the areas supervised by the M.O.H.—have no such staff on whom they can call to make preliminary investigations

RESEARCH

The facilities available to Medical Inspectors for investigating industrial diseases are limited The one important facility offered to them is the legal right to make clinical examinations of any factory worker after having obtained the worker's consent Apart from this they have no official access to hospitals pathological biochemical, or X ray departments. Admittedly they can apply to the Treasury for permission to pay fees for a limited number of pathological and X ray examinations; but permission is not readily obtained and it usually takes about three months for an application to be considered If a chemical analysis of air or dust in a factory process is needed the matter is referred to the engineering or chemical branch Usually after a good deal of delay a sample is taken and sent to the Government Laboratory for information on a specific point—e g whether arsenic is present or not. Complete analyses of samples are rarely done The difficulty with which Medical Inspectors obtain permission for X ray examinations of the chest illustrates the general lack of facilities for research X ray films are essential for the investigation of the incidence of industrial pulmonary diseases and large numbers of workers exposed to dusts of various kinds should be examined so that sound conclusions might be reached It is rare for a Medical Inspector to obtain Treasury permission to pay fees for more than 10 X ray films in any one year This limitation obviously prevents Medical Inspectors from carrying out investigations on any large scale

Despite these difficulties the Medical Inspectors, by collaborating with hospital physicians pathologists, and radiologists, and occasionally with the staff of the Medical Research Council, have managed over the years to make noteworthy contributions to industrial medicine In contrast to the facilities, the opportunities for research and investigation open to the medical branch of the Factory Department are unique They have access to every type of factory and the clinical material at their command is extensive

Some of the Medical Inspectors have long been of the opinion that they could make a much bigger contribution to industrial health (1) if they were given part time appointments as physicians on the staffs of hospitals in charge of departments of occupational diseases, and (2) if there were a central laboratory at which all chemical and physical analyses of samples could be made at their direction Plans embodying these two proposals have been submitted at various times over the past ten years but have always been turned down

Recently it was proposed to set up a department of industrial pulmonary diseases in connection with the London chest hospitals and the part time appointment of physician in charge of this department was offered to one of the Medical Inspectors of the Factory Department. The idea was to form a link between the Government industrial health services and the National Health Service Though this was approved in principle the Factory Department has not found it possible to agree that a Medical Inspector could hold a part time appointment in their department and another part-time appointment as physician in the National Health Service There is a Civil Service precedent for such division of work, for an established medical officer of the Ministry of Health has been physician to one of the London hospitals In Norway Sweden and Denmark the medical inspectors of factories hold positions on the staffs of hospitals and in addition have their own research laboratories. The result is that all three countries are making sound contributions to the study of occupational medicine. It is obvious that a doctor who is able to follow a patient from the factory to the hospital and back to the factory and has at his disposal both hospital and environmental laboratories, is able to get a better picture of the ætiology of occupational diseases If such a system were adopted in this country, benefits would accrue not only to the workers but also to industrial health services and the N.H.S., for coöperation between two services is best secured by having the same people working part time in both

LAYMAN AND DOCTOR

Admittedly the industrial health services are carried on by coöperation between doctors, engineers chemists nurses and other auxiliary workers But there is a regrettable tendency not only in this country to minimise the importance of doctors in health services. In the United States some health engineers have stated that a medical qualification is not necessary to supervise industrial health services In fact it seems that to hold a medical qualification is nowadays regarded as a disadvantage particularly in a health service As evidence of this trend it may be mentioned that the Dale Committee on Industrial Health Services did not take evidence from H M Medical Inspectors of Factories though they have perhaps wider experience of industrial medicine than any other group The Ministry of Labour apparently thought that evidence by lay administrators on health would be enough

Some degree of lay administrative control of policy in health matters is inevitable but responsibility for purely medical matters should be vested in doctors There may be good reasons why health policy should be directed by lay administrators, but it is difficult to understand why doctors in a health service should be controlled by engineers or by members of another profession There are much more powerful reasons why the engineers in a health service should be controlled by doctors

RECOMMENDATIONS

The Medical Inspectorate should form a separate branch of the Ministry of Labour under a Chief Medical Inspector of Factories

If it is accepted that the function of the Factory Department is to look after the health and well being of industrial workers, the present accident prevention branch (or in other words, the general Factory Inspectorate) could logically be placed under the industri health service controlled by the Chief Medical Inspector of Factories

Another possibility would be to transfer the Medical Inspectorate to the Ministry of Health as a step in the coöidination of all the health services in the country

In any case, the Medical Inspectorate should be strengthened by increasing the number of Medical Inspectors, by giving the senior Medical Inspectors adequate medical and lay staff, by making them part time physicians in charge of departments of occupational medicine in hospitals throughout the country, and by increasing their facilities for research and investigation.

Public Health

MASS RADIOGRAPHY AND PULMONARY TUBERCULOSIS IN GENERAL PRACTICE

HALLIDAY SUTHERLAND
M D Edin
CONSULTANT CHEST PHYSICIAN AND LATE MEDICAL DIRECTOR OF THE BIRMINGHAM MASS RADIOGRAPHY CENTRE

THERE is more undetected active pulmonary tuberculosis among the patients of general practitioners than in any other group of the community This warrants the attention of all concerned with the diagnosis, treatment, and control of tuberculosis Here are the facts

Following the example of my friend and colleague, Dr A E Beynon, of Nottingham, I established in November, 1949, a mass radiography service for the patients of general practitioners in Birmingham Before doing so I addressed the Local Medical Committee, and they circulated the following statement to every general practitioner in the city

> " The primary aim of mass radiography is the detection of unsuspected cases of pulmonary tuberculosis in the most vulnerable age and occupational groups of the community When a general practitioner has any reason from symptoms or physical signs to suspect the presence of pulmonary tuberculosis, the patient should, of course, be referred to the tuberculosis officer or chest physician, who is concerned with the diagnosis and treatment of this disease On the other hand, there are cases in which the cardinal symptoms and signs of pulmonary tuberculosis are lacking, but in which, to assist in a differential diagnosis, the general practitioner would like to exclude the possibility of pulmonary tuberculosis Already some doctors have found the advantage of referring these cases to the Mass Radiography Centre The general practitioner has only to give his patient a note on headed notepaper to the Mass Radiography Centre, 161, Corporation Street, Birmingham, (Telephone CENtral 2651) saying 'Please X ray Mr X and report' Miniatures are usually taken on Mondays, Tuesdays, and Wednesdays between 9 30 A M and 12 NOON and 1 30 and 4 P M If the patient can be included in the survey that is in progress, this will be done If not, he or she will be given an appointment "

This new service was an immediate success, and in the fourteen months ended Dec 31, 1950, 5702 patients were referred by general practitioners to the mass radiography centre To explain this success, I sought the opinion of individual practitioners and learned that it was easier to induce patients to attend a mass radiography centre than to attend a tuberculosis dispensary or chest centre associated with tuberculosis This reflects the social stigma attached to tuberculosis—a stigma apparent (inter alia) in the question put to all applicants for life insurance concerning a family history of tuberculosis I also learned that there was less delay in obtaining appointments for patients at a mass radiography centre than at a tuberculosis dispensary The reasons for this are obvious The tuberculosis dispensaries are working to their full capacity, and if the cases now referred every week to the Mass Radiography Centre had been referred every week to a tuberculosis dispensary, eleven sessions from a full time tuberculosis officer would be needed to deal with them By mass miniature radiography the number who should be referred to a tuberculosis dispensary is greatly reduced, and no patient is referred unless he or she needs treatment or long continued observation

Of the 5702 patients referred to the mass radiograph centre, 4119 gave a normal miniature, and their doctor were notified accordingly The number of patient recalled for large films was 1583, and of these 18 did no attend The large films were read by the consultan radiologist, Dr James Brailsford, and myself I 1046 cases the general practitioner was given the resu of the large film reading and the patients were no recalled for clinical examination In these cases th radiographic diagnosis was as follows

	No of cas
Abnormalities of bony thorax	12
Chronic bronchitis and emphysema	89
Bronchiectasis	1
Pulmonary fibrosis	3
Pleural thickening	103
Acquired cardiovascular lesions	38
Miscellaneous	9
Calcified primary tuberculosis	159
Calcified postprimary tuberculosis	15
Normal	617
Total	1046

The number recalled for clinical examination was 51 and of these 6 did not attend Of those who attende 286 were diagnosed without further reference to th chest centre or to a tuberculosis dispensary In the cases the clinical diagnosis was as follows

	No of cas
Chronic bronchitis and emphysema	35
Bronchopneumonia	25
Pulmonary fibrosis	12
Pneumoconiosis	6
Pleural thickening	35
Spontaneous pneumothorax	1
Intrathoracic new growth	4
Acquired cardiovascular lesions	23
Miscellaneous	3
Calcified primary tuberculosis	20
Calcified postprimary tuberculosis	67
Normal	55
Total	286

The clinical examination included sputum examinatio by the city bacteriologist, Mantoux tests, and seri radiographs In all cases the general practitione received a detailed clinical report

Of 227 cases referred for treatment or further observation at a chest centre, thoracic unit, or tuberculos dispensary, 125 had tubercle bacilli in the sputum at th time of the initial clinical examination In all referre cases the chest physician, thoracic surgeon, or tuberculosis officer received a copy of the clinical repor sent to the general practitioner and in which it wa suggested that the patient be referred Of the 22 patients advised to attend chest centres or tuberculos dispensaries, 6 did not attend In these cases, my clinical diagnosis was as follows:

	No of cases
Intrathoracic new growth	2
Active pulmonary tuberculosis	3
Healed pulmonary tuberculosis for further observation	1

The final diagnosis of the chest physician of the thoracic surgeon and of the tuberculosis officers in the 221 referred cases was as follows

	No of cases
Abnormalities of bony thorax	1
Chronic bronchitis and emphysema	2
Bronchopneumonia	2
Bronchiectasis	2
Pulmonary fibrosis	2
Pneumoconiosis	2
Basal fibrosis	2
Pleural thickening	3
Spontaneous pneumothorax	1
Intrathoracic new growth	20
Acquired cardiovascular lesions	1
Sarcoids	1
Active pulmonary tuberculosis	154
Calcified primary tuberculosis	1
Calcified post primary tuberculosis	17
Abscess of lung	3
Normal	7
Total	221

Including the 3 patients with active pulmonary tuberculosis who did not attend at a tuberculosis dispensary the total number of cases of active pulmonary tuberculosis was 157 out of 5702 cases referred by general practitioners to the mass radiography centre. In other words the incidence of unsuspected active pulmonary tuberculosis in cases referred by general practitioners was 28 per 1000 whereas among the general population throughout the United Kingdom the rate is 4 per 1000 Another disquieting fact was the discovery of 26 thoracic new growths, all of which were malignant This gives an incidence of 4 5 per 1000

The value of a mass radiography service for general practitioners has been established but it is capable of further extension Out of 550 general practitioners in Birmingham 280 (51%) are known to have made use of this service If a mass radiography service for general practitioners is to be established throughout the country then the recommendations of the British Medical Association's Group Committee on Tuberculosis (1950) must be disregarded The group committee visualises the medical director of a mass radiography unit as a junior medical officer working under the direction of a chest physician or a senior tuberculosis officer, and as holding the post of medical director for not more than two years. The medical director is to be deprived of all clinical work because 'the work of the unit should be limited to the detection of abnormalities When an abnormality is discovered its further investigation with the consent of the patient's general practitioner should be carried out at the clinic for chest diseases.' This would mean the unnecessary reference of a large number of patients to chest centres or to tuberculosis dispensaries Thus in Birmingham 886 doctors cases would have been referred to the chest centre or tuberculosis dispensaries instead of 227 The medical director would thus be deprived of valuable clinical experience. Moreover he would have too little to do Miniatures can be read at the rate of 300 an hour which means four hours work in a unit taking 1200 miniatures per week Another hour would cover the reading of large films I have heard the medical superintendent of a sanatorium suggest that, if no clinical work were undertaken by the medical director of a mass radiography unit that unit would be able to take more miniatures That is sheer nonsense because if too many miniatures are taken there is a bottle neck in the taking of large films. Further if a medical director is to have the confidence of general practitioners he should be a chest physician and as experienced as any senior tuberculosis officer in charge of a chest clinic. This was envisaged in the excellent report on The Tuberculosis Service in Scotland under the National Health Service." This report was the joint work of the Scottish Tuberculosis Association and the Consultant Committee, and is published by the B.M.A

To reduce the number of unsuspected cases of active pulmonary tuberculosis in general practice is the joint responsibility of our medical schools and of the practitioners The teaching on tuberculosis should be made more practical and up to date On the other hand the general practitioner should have time to examine his patients He should also make more use of the facilities provided by Public Health Authorities for the examination of sputum Of the patients referred to the Birmingham mass radiography unit, 125 could have been diagnosed by the general practitioner if he had sent the patient's sputum to the city laboratory No case should ever be diagnosed as chronic bronchitis unless the doctor has ascertained that no tubercle bacilli are present in the sputum If the sputum of every chronic bronchitic was examined many ' carriers of tuberculosis would be detected and could be taught those simple precautions whereby the spread of infection may be prevented. The B M.A could also make a most valuable contribution to the anti tuberculosis campaign by arranging short practical and interesting post graduate lectures on the early diagnosis of pulmonary tuberculosis.

It has been suggested but never in public, that because our sanatoria have long waiting lists nothing is to be gained by discovering through mass radiography a large number of unsuspected active cases. *Dementia senilis!* Even if no sanatorium bed be available, the patient can be taught how to lessen the risk of infecting other people. Even if no sanatorium bed be available, many patients could be treated successfully at home with streptomycin *p* aminosalicylic acid Domiciliary treatment was one of the functions of a tuberculosis dispensary as conceived by my teacher, Sir Robert Philip in his coördinated plan for the control and eradication of tuberculosis.

REFERENCE

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The Third Quarter

The Registrar-General's provisional figures[1] for England and Wales in the September quarter 1951 show that the infant-mortality rate of 23 6 per 1000 related live births and the stillbirth rate of 21 7 per 1000 live and still births were the lowest ever recorded in this country

The birth rate was 15 2 per 1000 population this is the lowest rate for a September quarter since 1941 when it was 14 0, and continues the decline recorded since the post war peak of 20·0 in 1947 The death rate was 9·1 per 1000 population; this rate is average for the same quarter over the last five years Births exceeded deaths by 67 038; the corresponding increase for the same period of the preceding year was 67,220

Survey of Sickness—10 751 men and 12 006 women were interviewed about their experience of sickness in the separate months of the June quarter of 1951 The average number of people per month who reported that they had suffered illness or injury of some kind during a month represented 63 4% of the men and 72 9% of the women who were interviewed The corresponding figures for the June quarter of 1950 were 61 7% and 73 1% The average number of consultations with doctors in a month was 43·4 for every 100 men interviewed and 49 2 for every 100 women. The average number of days of incapacity in a month due to sickness or injury was 0·92 among the men interviewed and 0 70 among the women

The proportion of housewives who reported some illness or injury was higher than for other women (75·4% compared with 67 3% for other women) Housewives also had slightly more consultations with doctors than other women (49·6% and 48 1% per month respec tively), but less reported incapacity (0 71 days per month compared with 0 85 days per month for other women)

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[1] Registrar-General's Return for the Quarter ended Sept 30 1951 H.M. Stationery Office Pp 3* 2s 6d

SCOTLAND

In Scotland[2] the infant-mortality rate of 32 per 1000 registered live births was also the lowest recorded in that country for any quarter The stillbirth-rate was 25 per 1000 total births The birth-rate was 17 0 per 1000 population—0 3 below the rate for the corresponding quarter of 1950 The death-rate was 10 2 per 1000 population—the same as in the September quarter of 1950

EIRE

In Eire[3] the infant-mortality rate in the third quarter was 30 per 1000 births registered, compared with 37 in the September quarter, 1950 The birth-rate was 21 9 per 1000 population—0 6 above the rate for the third quarter of 1950 The death-rate was 10 3 per 1000 population—the same as in the third quarter of 1950

Population —According to provisional results of the census of population, 1951, the population at April 9, 1951, was 2,958,878 (1,506,508 males and 1,452,370 females)

Health Education

Dr G A W Neill, medical officer of health for Barnsley, observes in his report for 1950 that a great deal of publicity has been directed to teaching people how to preserve their health and how to use the National Health Service to the best advantage The time is coming, however, when we must ask how effective all this has been.

"An honest answer to this question would hardly be encouraging The frequent mention in newspapers of abuses of facilities provided under the National Health Service, headlines relating to food poisoning outbreaks, scraps of conversation heard in the streets, and the circumstances surrounding at least two of the maternal deaths recorded in this report all seem to indicate that this work has met with a pathetically small measure of success "

It is difficult, adds Dr Neill, to instil new ideas into adults He suggests that a long-term policy should be adopted by teaching health in the proper place—the school.

"There is no reason at all why school medical inspection should not become a lesson instead of a somewhat meaningless routine carried out several times during school life Approached from this angle there is a justification for more frequent medical inspections and a complete answer to those who have recently thrown doubt on the value of such inspections Again, in the not too distant future, the School Medical Officers and Nurses might undertake the teaching of 'health' to the younger children. Instruction in the proper use of the Health and Social Services might be given to older children in the Secondary and Grammar Schools "

Dr Neill concludes that while such an approach would not have an immediate effect it offers the soundest means of securing the informed community that is essential to the ultimate success of the National Health Service

Care of the Aged

Dr Wyndham Parker, medical officer of health for Worcestershire, in his report for 1950 (the last before his retirement), remarks that unless the problem of our ageing population is wisely managed an increasingly heavy burden will fall on a diminishing number of wage-earners "The care and education of the young is essential for the nation's future, whilst the care of the aged is a debt of honour accepted by a civilised community " Further accommodation is needed both in hospitals for the chronic sick and in institutions for those needing care and attention Yet "a treble or quadruple bed increase does not provide an appropriate or even possible answer The only possible solution will be improved and increased services, made available through the general practitioner, in the homes of the people , these include district nursing, home helps, and medical comforts "

Pensionable age is an artificial definition it
physiology and pathology rather than a birthday an
versary that truly indicate old age , and fortunate
at least 4 out of 5 of the pensionable-age group neith
require nor want any assistance The average citiz
wishes to remain near his own relations and friends,
his own house Every authority should aim to help
achieving this object by (1) domiciliary service
(2) provision of suitable houses (where the accident r
is reduced to a minimum) , (3) the variety of servic
including recreational activities, provided through volu
tary agencies , and (4) persuasion, to foster the ent
of the family unit

Mass Radiography in Islington

The North-West Metropolitan Regional Hospi
Board is establishing in Islington a mass miniatu
radiography unit, which will remain there for at lea
twelve months This survey—the first of its kind
London—is described by the board as the first st
towards examining radiographically the whole ad
population of Islington

The Great Towns

To take account of the populations recorded at t
1951 census, the great towns of England and Wa
(i e , those with populations over 50,000) have be
increased in number from 126 to 160 From the start
this year the relevant tables of the Registrar-Genera
weekly returns are based on the new total, wh
represents about 10 % more population

Medicine and the Law

Evidence by Stomach-pump

AN American decision, reported in the *New York Ti*
of Jan 3, shows the usual Anglo Saxon reluctance
extract incriminating evidence from an accused pers
against his will

The accused man, by the name of Rochin, according
his own story was at home with his family in Los Ange
when three deputy sheriffs, following up some informat
that he was selling narcotic drugs, forced their way i
his room Before they could seize two capsules wh
were lying on a table near his bed, Rochin grabbed th
and put them into his mouth The officers, he said, tr
to choke the capsules out of him, but he swallowed the
He was then taken to hospital where a doctor, by mea
of a stomach pump, extracted the capsules which w
found to contain morphine He protested against
procedure, but was handcuffed and strapped to a ta
in order that the pump might be used Convicted
this evidence under the laws against drug traffic, he w
sentenced to 60 days' imprisonment The State courts
California held that the evidence was admissible althou
the method of obtaining it was illegal

On appeal to the Supreme Court at Washington,
State courts' decision was reversed by eight votes
none It was argued for the State of California that,
Rochin had swallowed an opiate, the "washing of
stomach " was merely routine first aid, "essential to
physical well being " In other words the use of
stomach pump was justified on medical grounds as
the interests of the patient The Supreme Court, howev
regarded the action as going too far Sitting, as they do,
interpret and apply the Constitution of the United Sta
(which overrides all statute law), the Supreme Cou
judges found that the action contravened the Constitutio

Six judges regarded it as offending against the Fou
teenth Amendment, which declares that no State sh
enact anything to deprive any person of life, liberty,
property "without due process of law " What h
happened, said Mr Justice Frankfurter, went far beyo
conduct which merely offended a fastidious squeamis
ness or a private sentimentalism about the too energe
combating of crime It was conduct which shocked

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[2] Quarterly Return of the Registrar General Scotland, for the Quarter ended Sept 30 1951. H M Stationery Office Pp 36 2s 6d

[3] Quarterly Return of the Marriages, Births and Deaths Registered during the September Quarter 1951 Obtainable from the Government Publications Sale Office 3–4 College Street Dublin Pp 44 6d

conscience "Illegally breaking into the privacy of the petitioner, the struggle to open his mouth and remove what was there, and the forcible extraction of the contents of his stomach—this course of proceeding' was 'too close to the rack and the screw to permit of constitutional differentiations.

Two other judges held that there had been a violation of the Fifth Amendment which declares that no man can be compelled to be a witness against himself in a criminal case. One of the two observed that the evidence against Rochin would have been admissible in most States of the Union he could not agree that a rule which the majority of the States had adopted could be a violation of the decencies of civilised conduct The other judge considered that the Supreme Court could not nullify a State statute merely because it thought that the statute authorised conduct which shocked the conscience Whatever their differences of approach all the judges held that the evidence must be excluded

English law as enforced by the judges and as operated by stringent directions to our police officers protects an accused person by most drastically restricting or excluding the evidence against him if procured from him by threats promises, or coercion A hospital operation to save life would naturally be very different from an operation to extract evidence. The all important difference between the law of the United Kingdom and that of the United States is that in this country Parliament is supreme In the improbable event of Parliament enacting that in cases under the Dangerous Drugs Acts suspects might be subjected to the stomach pump and evidence might be given of the results our judges (whatever personal reluctance they might feel or even express) would be obliged to admit the evidence

Filming a Surgical Operation

In the case of the stomach pump Mr Justice Frankfurter spoke of the *invasion of privacy* Another case, mentioned in the *New York Times* of Dec 12 will raise a rather different issue A woman who gave birth to triplets two years ago is claiming damages against a doctor who she says, took motion pictures (with sound accompaniment) of the birth This she complains was done without her knowledge or consent; she had been humiliated on meeting persons who had viewed the films and she asserted that her embarrassment had culminated in a nervous breakdown

In England the legal implications of the right of privacy have been discussed in law journals as well as being somewhat inadequately expounded in decided cases Actions for libel (as in the famous Artemus Jones case) go some way to assert the right Occasionally a plaintiff has sought an injunction to restrain unauthorised publicity, as in Mr Cyril Tolley's case where a famous golfer's name was quite irrelevantly introduced into an advertisement or in the Dunlop tyre case where Mr Dunlop complained that an entirely imaginary pictorial representation of himself was advertised without his consent

English judges and juries would be reluctant to restrict the modern technique of teaching surgery by means of the film but they might be likely to disapprove the publication of details of physical conditions, normal or abnormal in the case of patients actually identified or identifiable The surgeon or physician has a professional duty of secrecy in the interest of the patient and this well known *obligation is relaxed only under the* forensic compulsion (not always enforced) of the witness box The relation between patient and practitioner is based on the confidence which *the former can feel* in the silence of the latter It should be possible to add to the store of medical knowledge without violating any right of privacy It has yet to be seen whether in the American case under discussion a right has been infringed

In England Now

A Running Commentary by Peripatetic Correspondents

APOLOGIE FOR FORGETFULNESSE

To a Faire Ladye on being reproved for leaving Impedimenta behind

One leaves a silken Handkerchief
Another drops a Glove
That these may serve as slender Chains
To solder sundered Love

But I my Stethoscope resign
When Fortune bids us part
That it may catch your lightest breath
The Message of your heart

* * *

Within a quarter of an hour a second eleven year-old joined his friend in our Casualty Department with widely dilated pupils and body writhing in delirium An hour before, the two had wandered over to the little island between Barnes and Hammersmith known as Chiswick Eyot and they must have eaten some poisonous plant growing on this stretch of Thames girt mudbank Rapid recovery followed gastric lavage; but the identity of the poison remained a problem Our pharmacologist (a keen man) insisted that the plant should be traced one of the effects of the toxin had been such as to arouse envy and incredulity in the breast of any *Cantharis vesicatoria*

Determined to advance the frontiers of medical science we crossed to Chiswick Eyot at low tide, shod with rubber boots filched from the theatre and bearing our Excalibur —a table-knife whose blade bore the legend J Lyons & Co ' We delved in the mud and uprooted specimens of dank and pallid Thames flora One of our party seized by a zest for thorough ecological sampling rashly attempted to tuck a nesting swan into our jam jar—pardon *vasculum.* At this point the explorers were beset by the Eyot aborigines average age 9 years, dress sub European demeanour hostile We retreated to the bank amid torrential jeering drove damply back to hospital and spread our spoils before the recent sufferers For our blood toil tears, and sweat we had gained mud, soil weeds and wet No spark of recognition was kindled in the boys by our malodorous trophies.

Our pharmacologist groans at the receding prospect of fame and an M D thesis; and heaven help us when Theatre Sister sees her boots.

* * *

We had all grown sixteen years older since our last meeting—with the exception that is of our teacher At his eighty first birthday party he welcomed in friendly and whimsical way each of his clinical sons, recalling at once our work and interests Under his arm he nursed the largest box of cigars we had ever seen.

The horseshoe table was arranged as on the occasion when we celebrated his retirement from the active staff but alas our former chairman was no longer with us Grace was said the soup appeared and conversation began. The more senior of us oldish men by accepted standards marvelled at the boyish figure and upright bearing of our guest

We expressed affection and filial gratitude; for had he not passed on the torch from Samuel Gee? Then in mellowed tones he replied—Solon one moment and Puck the next Each in turn was addressed and reminded of moments of humility or greatness. Erudite house physicians perhaps but few of us were competent gardeners had not one enthusiastically uprooted our chief's nut trees in mistake for unwanted sycamores? We recalled too the forgotten civic dignitary waiting patiently behind the screen for permission to dress We were back in Rahere and Colston wards. The fountain played once more in the square as we waited for the chauffeur-driven coupe to round the corner Out again sprang the dapper little man with the largish well poised black homburg the doctors doctor the man of perpetual good humour and common sense who wasted no time but enjoyed the company of all men Good morning, anything upstairs ? " he would inquire with a proprietary nod of the head in the direction of the pathologists' preserves We recalled moments off duty too, in his garden "I know it is barely five," he would say apologetically at the door , " but I thought you would want to enjoy this beautiful morning " , and then with a mild rebuke and a chuckle he would add, " but you are too late for the nightingale "

All too soon the delightful evening passed With memories refreshed and old friendships revived, we had learnt one more lesson from our teacher, that youth need never leave us A busy life, planned relaxation, good humour, and, above all, a zest for living with a love of people and of Nature, are the diagnostic signs of our physician's philosophy

* * *

Ten months ago I was asked by his wife to visit Mr Sleeper, the publican "I'm dreadfully worried about him," she said , but knowing that she has a great gift for worry I was not unduly perturbed The most cursory clinical inspection of Mr S convinced me that he was consuming his own smoke This surprised me because, though engaged in a dangerous trade, I knew him to be a devout and hitherto highly abstemious person "Lay off it, old boy," I murmured "Right, doctor, I will," he said, " here and now " "Will you be able to manage it ? " I asked " Certainly," he said, " with God's help I gave up smoking the same way a year ago " "He's very strong willed," interpolated Mrs S (she kept on interpolating) Sure enough Mr S went bone dry

About a month ago I was called again He had a spectacular rash on his face and forearms, due, he assured me, to a herbal remedy his wife had made him take against the rheumatism "Do you get rheumatism ?" I asked " Never a twinge," said Mr S, " but the wife says I must have and made me take this stuff Look at the result " He showed me a tin of innocuous-looking dried grasses " Can't believe this did it," I said " Let's have a skin doctor " The dermatologist took one look " Neurodermatitis," he said " Wife a bitch ? " " You said it," I answered We got Mrs S out of the way —" Assert yourself, Mr S," said the dermatologist, " and your skin will soon get better "

A week later Mrs S rang up again and spoke, as usual, at some length "He's back on the bottle, doctor," she said (among other things) " He's in the saloon bar now talking religion to the customers They don't like it." When I called next morning Mr S was alone He looked fighting fit and his rash was almost gone " It's all right, doctor I had half a bottle of gin last night but I shan't do it again I told the wife that she wasn't to come into my bars at all in future I'll look after them (I said) and you can peel the potatoes and look after the house Took it surprisingly well, she did Quite humble she was, this morning 'May I go into Rattlebury and do a bit of shopping ? ' she asks 'Certainly, sweetheart,' I said (She hates me calling her sweetheart because she knows I don't mean it) 'Take any money you want out of the cash box and don't hurry back,' I said 'You needn't come back at all if you don't want to ' "

As a matter of fact, she did come back and I have heard no more Further developments are awaited with interest

* * *

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MAN SHOT AT " FOX "—HIT WOMAN
Evening Standard headline

" Gad, sir, a close shave "

* * *

Peter, aged 4, on seeing a picture of the Nativity for the first time " I suppose the baby was born in the cowshed because there were no beds in the hospital."

* * *

Postumus writes " Eheu, fugaces proctalgiæ, proctalgiæ ! "

Letters to the Editor

COLLEGES AND FACULTIES

SIR,—The interesting lecture by Sir Ernest Finch i your issue of Jan 5 helps to bring to notice the lack of higher qualifications in pathology

The M D varies too much from university to university to be a criterion of a man's suitability for a consultant post in pathology The diploma in clinical pathology has the reputation of being concerned overmuch wit technique and not enough with the principles of patholog and their clinical application It is too early to judg the new diploma in pathology set up by the two senio (English) Royal Colleges, but the requirement that candidates must have spent at least one year in the laboratorie of a university will exclude many promising young men furthermore, if ever the diploma were to become generall recognised, it would give the universities a control ove entry into pathology which they exercise over entry int no other specialty Sir Ernest Finch regards diploma as qualifications for specialists (e g , S H M O) but a inadequate for full consultants I agree with him

In recent years the Royal College of Surgeons ha played an enlightened rôle in establishing representati organisations and examinations for the specialti associated with surgery Nothing comparable has take place in the specialties associated with medicine , t Royal College of Physicians of London caters chiefly f general physicians Action of some kind would appe desirable As far as pathology is concerned, three cours seem possible (*a*) the setting up of a faculty or colle for pathology , (*b*) the setting up of a college to embra all the specialties associated with medicine except gener medicine itself , or finally, and perhaps best of a (*c*) recognition by the Royal College of Physicians London of its responsibilities This last course wou demand perhaps some changes in the constitution of t college , it might lead to the implementation of section of the Medical Act of 1858 and give the corporation t title " Royal College of Physicians of England " , I ho that it would lead to the setting up of a suitable high qualification for pathologists

The view has been expressed that all clinical path logists should obtain the M R C P London The avera man qualifies, holds a house appointment for six mont serves in the Forces for two years, and then retur aged 26 or 27, to begin his specialist training To expe the majority of would-be pathologists to remain general medicine and not apply for pathological pos until they obtain the M R C P is, in my opinion, to igno the realities To pass the M R C P examination as pathologist is extremely difficult

The cordial reception given to the proposal to establi a college or other body for the encouragement of gener practice makes pathologists think of their own branc For an increasing number of purposes the Royal Colle of Physicians is regarded as the "appropriate" college respect of pathology , but the great majority of consultan in pathology, being neither fellows nor members of th college, have no voice in deciding what action the colle shall take in pathological matters

Would the Royal College of Physicians, the seni medical corporation, care to give a lead ?

Sheffield. ARTHUR JORDAN

SIR,—A College of General Practice is now propose and all of us who are today concerned for the futu of general practice must surely welcome the proposal an the enterprising spirit of the proposers

At this early stage, whilst it is still possible to pla a course of action, it is most urgent in my opinion t declare that the new foundation must be utterly an completely *independent* , it must be founded, organise run, and presided over by general practitioners, an membership open only to general practitioners What ever independence costs in terms of money and struggles must be suffered because in no other way can the new college become the effective voice and organisation of what is after all the greatest part of the profession in these islands It is curious that for so long there has existed no organisation catering exclusively for us and I am certain that our weakness lies in that very absence

The interests of the three Royal Colleges are of their specialties how can they represent general practice? I want to record my conviction that THE LANCET s suggestion of Dec. 8 that the three Royal Colleges and they alone, should be responsible for the foundation of a Faculty of General Practice, is most dangerous it would eclipse our independence at once

I suggest that all full time general practitioners be made automatically members of this new college on payment of a subscription that we aim to achieve a Royal charter to become an examining and instructing body, that we institute a fellowship diploma to be awarded at the discretion of the college council and that the new college be called the College of General Practitioners I suggest too a calling of general practitioners in every area to meet and form local branches and give it strength and support

I am sure that if we could feel that at last we were really going to create an *effective* organisation exclusively our own there would be tremendous enthusiasm But it must be utterly independent I do not mean we should live in a vacuum we can have plenty of liaison with existing bodies of all kinds but we must meet them as equals Twenty thousand général practitioners must no longer remain without their organisation or be made a minor branch of the specialists' organisations.

I wish strength and foresight enterprise and good fortune to the new college

Gateshead K T BROWN

SIR,—Sir Ernest Finch in his Bradshaw lecture published in your issue of Jan 5 has rightly brought into focus several of the problems in the prickly and perennial discussion on the evolution of consultants and specialists

It is saddening to be informed that the term general surgery ' is obsolete But even if we must accept this as a necessary penalty for the advances of knowledge and time it surely need not be applied too early in the aspirants career Perhaps Sir Ernest will tell us why the Royal College of Surgeons has not considered (so far as I know) reorganisation of its diploma of fellowship Is it not time for the college to reduce the present M R C.S to L.R.C.S and then introduce a new M R C.S to replace the present F R C.S ? This M R C.S would then have a place comparable with the M R.C P and the M R.C O G The examination for the new M R C.S would require knowledge of general surgery The F R C.S might then be awarded later by election and carry with it those recognitions of merit which are normally gained through practice teaching and research This might well check some of the present-day tendencies of too-early extreme specialisation and give the man with the new M R.C S time to gain wisdom that is clinical sense and sound judgment based upon accumulated experience rather than an immediate aim in technical operative skill.

It is a matter of great importance that the former ladder of promotion towards full consultant status has been more or less liquidated The element of educational free enterprise in that struggle for personal progress and for higher qualifications seems to have seriously abated Gone it seems are the days when the young man willingly devilled along in the departments of physiology pathology or anatomy eking out a bare livelihood for a few years while his mind fastened on to the basic principles of his later work be it as surgeon or physician Worse still as Sir Ernest laments where are the keen industrious and opportunist assistant physicians or assistant surgeons of former days?—days in which the earning of a few guineas by lectures to nurses or in clinical tutorships was not scorned as a nuisance

I respectfully suggest that while for several reasons we in no way wish to see any reappearance of the faults of the old system (and there were some) it is eminently desirable that the 'assistant' status be reintroduced It lends itself better to maintaining teams or firms' in hospitals and usually ensures more happy arrangements as between junior and senior consultant—which is to the good of all on the firm including the students. The teaching and practice is likely to be better balanced and an abiding respect for the chief is no small consideration The suggestion that the junior consultant might, in the first years anyhow work whole time is worth considering although, some early acquaintance with the problems of domiciliary consultations should not be excluded since this is an essential part of the practical sphere of a consultant s life and influence Sir Ernest rightly emphasises that the (nearly) whole time assistant would have opportunities for attention to clinicopathological discussions and not least to the important practice in casualty departments—often relatively neglected though a valuable place for teaching principles of general surgery and general medicine and a sense of responsibility and urgency in clinical assessment Thus at least some general surgery ' would remain in the weekly experiences

Schemes of training for consultants whether organised by a central committee or by a British Academy of Medicine should avoid over regimentation. The best men will, I believe always find their own way and largely discover their own resources and be all the better for it Spoon feeding courses merely increase the ocean of the mediocre And in the matter of diplomas such as say the D A D I O, D C H and D OBST why regard these as a qualification to specialise ? They should more appropriately signify that a general practitioner has gained extra experience to enhance his usefulness Every aspirant to specialism ' or consultant service (and a careful use of these words is called for) should become at least a member of one of the three Royal Colleges (supposing here that the new M R.C.S is introduced) The need to gain membership should not be circumvented by amassing junior diplomas in special subjects

Department of Child Health
University of Bristol A V NEALE.

PROPRIETARY PREPARATIONS AND THE N.H.S

SIR,—The carefully reasoned article in your Points of View column on Jan 5 will be welcomed by the pharmaceutical industry as a just summary of the financial controversy centred on the prescribing of ethical proprietaries

The necessity for economy in the National Health Service is unquestioned and your correspondent has performed a valuable service in bringing the actual figures to the attention of your readers without these a balanced view cannot be formed of a problem which is almost invariably the subject of prejudice and misunderstanding by the general public and even by some sections of the medical profession

The growing pharmaceutical export trade reached £30 242 405 in the first eleven months of 1951—an increase of nearly 40% over the 1950 total quoted in the article Furthermore, the figure of £24 5 million quoted in the revised estimates for 1951–52 for the ingredients of prescriptions includes container allowance and the cost of dressings and appliances. The cost of drugs is around £20·5 million and ethical proprietaries on the rough estimate of 40% may be taken as £8 2 million or approximately 2% of the taxpayers bill for the National Health Service anything upstairs ? " he would inquire with a proprietary nod of the head in the direction of the pathologists' preserves We recalled moments off duty too, in his garden "I know it is barely five," he would say apologetically at the door, "but I thought you would want to enjoy this beautiful morning", and then with a mild rebuke and a chuckle he would add, "but you are too late for the nightingale"

All too soon the delightful evening passed With memories refreshed and old friendships revived, we had learnt one more lesson from our teacher, that youth need never leave us A busy life, planned relaxation, good humour, and, above all, a zest for living with a love of people and of Nature, are the diagnostic signs of our physician's philosophy

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A week later Mrs S rang up again and spoke, as usual, at some length "He's back on the bottle, doctor," she said (among other things) "He's in the saloon bar now talking religion to the customers They don't like it" When I called next morning Mr S was alone He looked fighting fit and his rash was almost gone "It's all right, doctor I had half a bottle of gin last night but I shan't do it again I told the wife that she wasn't to come into my bars at all in future I'll look after them (I said) and you can peel the potatoes and look after the house Took it surprisingly well, she did Quite humble she was, this morning 'May I go into Rattlebury and do a bit of shopping ? ' she asks 'Certainly, sweetheart,' I said (She hates me calling her sweetheart because she knows I don't mean it) 'Take any money you want out of the cash box and don't hurry back,' I said 'You needn't come back at all if you don't want to ' "

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dates must have spent at least one year in the laboratories of a university will exclude many promising young men ; furthermore, if ever the diploma were to become generally recognised, it would give the universities a control over entry into pathology which they exercise over entry into no other specialty Sir Ernest Finch regards diploma as qualifications for specialists (e g , S H M O) but a inadequate for full consultants I agree with him

In recent years the Royal College of Surgeons ha played an enlightened rôle in establishing representativ organisations and examinations for the specialtie associated with surgery Nothing comparable has take place in the specialties associated with medicine, th Royal College of Physicians of London caters chiefly fo general physicians Action of some kind would appea desirable As far as pathology is concerned, three course seem possible (*a*) the setting up of a faculty or colleg for pathology, (*b*) the setting up of a college to embra all the specialties associated with medicine except gener medicine itself, or finally, and perhaps best of a (*c*) recognition by the Royal College of Physicians London of its responsibilities This last course wou demand perhaps some changes in the constitution of t college, it might lead to the implementation of section of the Medical Act of 1858 and give the corporation t title "Royal College of Physicians of England", I ho that it would lead to the setting up of a suitable high qualification for pathologists

The view has been expressed that all clinical path logists should obtain the M R C P London The avera man qualifies, holds a house appointment for six mont serves in the Forces for two years, and then retur aged 26 or 27, to begin his specialist training To expe the majority of would-be pathologists to remain general medicine and not apply for pathological pos until they obtain the M R.C P is, in my opinion, to igno the realities To pass the M R C P examination as pathologist is extremely difficult

The cordial reception given to the proposal to establi a college or other body for the encouragement of gener practice makes pathologists think of their own branc For an increasing number of purposes the Royal Colleg of Physicians is regarded as the "appropriate" college respect of pathology, but the great majority of consultan in pathology, being neither fellows nor members of the college, have no voice in deciding what action the colleg shall take in pathological matters

Would the Royal College of Physicians, the senio medical corporation, care to give a lead ?

ARTHUR JORDAN
Sheffield

SIR,—A College of General Practice is now proposed and all of us who are today concerned for the futur of general practice must surely welcome the proposal an the *enterprising spirit of the proposers*

At this early stage, whilst it is still possible to pla a course of action, it is most urgent in my opinion t declare that the new foundation must be utterly an completely *independent*, it must be founded, organised run, and presided over by general practitioners; an membership open only to general practitioners What ver independence costs in terms of *money and struggles* must be suffered because in no other way can the new ollege become the effective voice and organisation of that is after all the greatest part of the profession in these islands It is curious that for so long there has xisted no organisation catering exclusively for us, and am certain that our weakness lies in that very absence

The interests of the three Royal Colleges are of their pecialties: how can they represent general practice?

want to record my conviction that THE LANCET's uggestion of Dec 8 that the three Royal Colleges, and hey alone should be responsible for the foundation of a Faculty of General Practice, is most dangerous It would eclipse our independence at once

I suggest that all full time general practitioners be made automatically members of this new college on payment of a subscription that we aim to achieve a Royal charter to become an examining and instructing body, that we institute a fellowship diploma to be awarded at the discretion of the college council and that the new college be called the College of General Practitioners I suggest, too a calling of general practitioners in every area to meet and form local branches and give it strength and support

I am sure that if we could feel that at last we were really going to create an *effective* organisation exclusively our own there would be tremendous enthusiasm But it must be utterly independent I do not mean we should live in a vacuum we can have plenty of liaison with existing bodies of all kinds but we must meet them as equals Twenty thousand général practitioners must no longer remain without their organisation or be made a minor branch of the specialists organisations

I wish strength and foresight, enterprise and good fortune to the new college

Gateshead K T BROWN

SIR—Sir Ernest Finch in his Bradshaw lecture published in your issue of Jan 5, has rightly brought into focus several of the problems in the prickly and perennial discussion on the evolution of consultants and specialists.

It is saddening to be informed that the term general surgery' is obsolete But even if we must accept this as a necessary penalty for the advances of knowledge and time it surely need not be applied too early in the aspirants career Perhaps Sir Ernest will tell us why the Royal College of Surgeons has not considered (so far as I know) reorganisation of its diploma of fellowship Is it not time for the college to reduce the present M R.C.S to L.R C.S and then introduce a new M R C S to replace the present F R.C.S ? This M R.C.S would then have a place comparable with the M R.C P and the M R.C O G The examination for the new M R C S would require knowledge of general surgery The F R C.S might then be awarded later by election and carry with it those recognitions of merit which are normally gained through practice teaching and research This might well check some of the present-day tendencies of too-early extreme specialisation and give the man with the new M R.C.S time to gain wisdom that is clinical sense and sound judgment based upon accumulated experience' rather than an immediate aim in technical operative skill

It is a matter of great importance that the former ladder of promotion towards full consultant status has been more or less liquidated The element of educational free enterprise in that struggle for personal progress and for higher qualifications seems to have seriously abated Gone it seems are the days when the young man willingly devilled along in the departments of physiology, pathology or anatomy eking out a bare livelihood for a few years while his mind fastened on to the basic principles of his later work be it as surgeon or physician Worse still as Sir Ernest laments, where are the keen industrious and opportunist assistant physicians *or assistant surgeons of former* days?—days in which the earning of a few guineas by lectures to nurses or in clinical tutorships was not scorned as a nuisance

I respectfully suggest that, while for several reasons we in no way wish to see any reappearance of the faults of the old system (and there were some) it is eminently desirable that the "assistant' status be reintroduced It lends itself better to maintaining teams or ' firms in hospitals and usually ensures more happy arrangements as between junior and senior consultant—which is to the good of all on the firm including the students The teaching and practice is likely to be better balanced and an abiding respect for the chief is no small consideration The suggestion that the junior' consultant might, in the first years anyhow, work whole time is worth considering, although some early acquaintance with the problems of domiciliary consultations should not be excluded since this is an essential part of the practical sphere of a consultant s life and influence Sir Ernest rightly emphasises that the (nearly) whole time assistant' would have opportunities for attention to clinicopathological discussions, and not least to the important practice in casualty departments—often relatively neglected though a valuable place for teaching principles of general surgery and general medicine and a sense of responsibility and urgency in clinical assessment Thus at least some general surgery would remain in the weekly experiences

Schemes of training for consultants whether organised by a central committee or by a 'British Academy of Medicine' should avoid over regimentation. The best men will I believe, always find their own way and largely discover their own resources, and be all the better for it Spoon feeding courses merely increase the ocean of the mediocre And in the matter of diplomas such as say the D A D L O D C H., and D OBST why regard these as a qualification to specialise ? They should more appropriately signify that a general practitioner has gained extra experience to enhance his usefulness Every aspirant to 'specialism" or consultant" service (and a careful use of these words is called for) should become at least a member of one of the three Royal Colleges (supposing here that the new M R.C.S is introduced) The need to gain membership should not be circumvented by amassing junior diplomas in special subjects.

Department of Child Health
University of Bristol
A V NEALE

PROPRIETARY PREPARATIONS AND THE N H.S

SIR,—The carefully reasoned article in your Points of View column on Jan. 5 will be welcomed by the pharmaceutical industry as a just summary of the financial controversy centred on the prescribing of ethical proprietaries

The necessity for economy in the National Health Service is unquestioned and your correspondent has performed a valuable service in bringing the actual figures to the attention of your readers without these a balanced view cannot be formed of a problem which is almost invariably the subject of prejudice and misunderstanding by the general public and even by some sections of the medical profession

The growing pharmaceutical export trade reached £30 242,405 in the first eleven months of 1951—an increase of nearly 40% over the 1950 total quoted in the article. Furthermore the figure of £24 5 million quoted in the revised estimates for 1951–52 for the ingredients of prescriptions, includes container allowance and the cost of dressings and appliances. The cost of drugs is around £20 5 million and ethical proprietaries on the rough estimate of 40% may be taken as £8 2 million or approximately 2% of the taxpayers bill for the National Health Service

No really effective means of reducing costs can be established as long as the drive for economy is concentrated on the prescribing of proprietaries and ignores the remaining 98% of the cost of the service

Association of British Pharmaceutical Industry, Tavistock House South, London, W C 1 — **Gordon Smith**, Secretary

CANCER IN AFRICA

SIR,—We would like to give strong support to the suggestion in your leading article of Oct 20 that more attention should be paid to the problems of cancer in Africa The faculty of medicine of Makerere College set up a committee early in 1951 to organise a cancer survey of this town in which all the hospitals have agreed to cooperate This has been done because the faculty are impressed with the frequency and importance of cancer in Africans and feel that a proper study would not only be of local value, but might provide clues which could be followed up in better equipped centres and might extend considerably our knowledge of ætiological factors in cancer On behalf of the committee we would like to offer its fullest support and cooperation to any body interested in conducting such a survey as you envisage

The conduct of any cancer survey in Africa is an extremely difficult matter There are no vital statistics of real accuracy, and follow-up is difficult if not impossible relatively few patients know their ages, and the same patient may appear in a different hospital, or even in the same hospital, under a bewildering variety of names The extreme pressure on beds precludes the admission of patients for whom no further radical treatment is possible and leads to the discharge of others where nothing further can be done The first endeavour of the committee is to ascertain the types of cancers seen in outpatients who, for one reason or another, are not admitted to hospital The next step will be to make a detailed study of the cases admitted to hospital We would welcome advice from any who have experience of similar surveys

We would like to utter a word of caution against excessive concentration on the study of primary hepatic carcinoma Undoubtedly in its frequency and behaviour there is a most striking contrast with conditions in Europe and America But it would be wrong to suppose that, if hepatic carcinoma is excluded from consideration, the cancer picture is similar to that seen in Europe In fact it is widely different There is apparently an extraordinary frequency of lymphosarcoma and other malignant tumours of the reticulo endothelium, and a remarkable incidence of Kaposi sarcoma and of carcinoma and other malignant tumours of the male breast [1] Carcinoma and other tumours of the small intestine appear to be unduly common, on the other hand, cancers of the colon and rectum appear to be unduly rare [2] We cannot believe that, in a hospital with over 140,000 outpatients and over 14,000 inpatients per annum, these are matters of selection

As previously pointed out in your columns,[3] there is very suggestive evidence for the belief that the high incidence of certain of these cancers (e g, hepatic carcinoma) may be influenced by the tendency to feminisation in Africans, possibly due to an hormonal imbalance from widespread liver damage Other common cancers (e g, epitheliomas of the penis and leg) are likely to be due to the frequency of tropical phagedænic ulceration Others, such as carcinoma of the salivary glands, may be due to malnutrition Indeed we feel that such a cancer survey as you propose should not be confined to hepatic carcinoma but should dig deep, not merely into cancer, but into the general disease pattern For when all question of the effects of parasites and the tropical parasitic diseases are excluded, the general disease pattern in Africans still differs considerably from that of Europe It has been pointed out in your columns [4] that the diseases of "stress," so much in the news now, are all rare in Africans Is the African reaction to stress abnormal, or is it normal and the European reaction abnormal ?

We are still uncertain how far the cancer incidence, and indeed the whole disease picture, is influenced by the comparative youthfulness of our patients In this hospital, when all deaths under 10 years of age are excluded, the average age of patients coming to autopsy is still only about 30 years Can this possibly explain the low incidence of postoperative embolism and thrombosis in Africans as compared with the high incidence in Europeans, even in Uganda ?

We hope, Sir, that none of the points to which we have drawn attention will weaken the force of your plea for a full investigation On the contrary we hope that they will strengthen it We would only wish to suggest that its scope should not be too narrow and that it should not be too long delayed Time presses, this country and other African countries are going through a stage of rapid evolution Industrialisation and urbanisation, rising living standards, and all the other associated changes will alter the patterns, and when these changes are well advanced we may regret that we did not make full investigations earlier We would also like to suggest that those who wish to put forward ætiologic theories of disease might be wise to consider the incidence and behaviour of the diseases they are interested in amongst Africans and other inhabitants of tropical countries.

Departments of Surgery and Pathology Makerere College Kampala, Uganda — **H J. Croot**, **J N P Davies**

POTASSIUM LACK IN THE POST-GASTRECTOMY DUMPING SYNDROME

SIR,—Your issue of Oct 27, containing Dr Hamilton Smith's valuable contribution to the dumping-syndrome problem, has just reached me He has found one more piece that goes into the puzzle, but the picture is still incomplete

There can be no doubt from his figures that a highly significant fall in serum-potassium occurs after the standard meal in patients with the dumping syndrome, and the other observations tend to confirm this (Comparing the falls after the standard meal in the normal subjects with those in the dumping plus jejunostomy groups, P is less than 0 01) It may well be that this fall is the cause of the symptom of weakness, but the case is not yet proved Other phenomena have been observed in association with dumping symptoms—hyperglycæmia, an outpouring of fluid into the jejunum, intestinal hypermotility, descent of the gastric stoma, and so on—and all of these have, at one time or another, been held responsible for the symptom complex Distending a balloon in the jejunum will reproduce the whole syndrome (including the weakness) in some patients, and there is no reason to doubt that a mercury-weighted bag in the stomach remnant will do so too Do these stimuli, as well as hypertonic glucose, cause a fall in serum potassium ? Do gastrectomised patients without dumping symptoms show a similar fall ? These and many other questions still need to be answered

Dr Smith refers to, and has confirmed, the observation of Dr A J Glazebrook and myself that hexamethonium bromide will relieve dumping symptoms in some cases but concludes that it is impossible to say whether it does so "by lessening jejunal reactivity or by delaying gastric emptying " In our experiments (which were done in Liverpool) the hypertonic solutions were introduced directly into the jejunum through a Miller-Abbott tube, and kymographic records were made and correlated with the symptoms. We concluded that jejunal hyperactivity was the main cause of the symptoms and that hexamethonium bromide acted by abolishing it. Preliminary reports of this work have been published,[1] and a full account is in the press.[2]

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[1] Davies J N P *Brit med J* 1949 ii 676
[2] Mulago Clinical Meeting *E Afr med J* 1951 28 474
[3] Davies J N P *Lancet* 1949 ii 474
[4] Trowell, H C *Ibid*, 1950, ii, 454.

Institute of Experimental
Medicine The Mayo Clinic,
Rochester Minn., U.S.A

RICHARD B WELBOURN

ECONOMY IN X-RAY FILM

SIR,—Dr Edwards and Dr Midgley (Jan 5) have made a belated plea for economy in the use of X ray films Because we are short of these, essential radiographic services are being jeopardised and the reason for the shortage is that they are being extravagantly wasted chiefly by those clinicians who fail to consider properly the need for radiographic examination and to assess the value to the patient of the evidence which this expensive service yields

A careful census of films used would show that on this basis the percentage wastage was in the region of 70 and often over 90 and the tuberculosis and chest service would easily top the list in waste For over ten years I have been repeatedly urging the need for reasonable care in the use of X ray films. I forecast the present outcome before the inception of the new service with its wastefulness. I saw the same waste in the U.S A and even against opposition did not miss any opportunity of drawing attention to it [3]

The defence of the chest specialist is that "the radiograph is our radar That is true but heedless use of radiology is often against the best interests of the patient; for men and women who would have remained happy and well have fallen victims to the radiograph There is tremendous waste not only in case-finding but also in treatment, and this applies to other services than those concerned with the chest This can readily be demonstrated by any unbiased person who will carefully examine the large batches of films of individual patients—I have counted more than 100 large films of one patient—for he will find that the whole sequence of changes can be recorded from the examination of 3–6 films selected from the bunch Some patients would be better mentally if they were not dragged so often to the X ray department to await the disappointing report no change," while others would be better physically because they would have to be judged by their clinical condition and would escape the damaging activities incited by the interpretation of radiographic appearances. I am often amazed by the relatively trifling radiographic changes that give rise to major surgery in patients who are fit and well and have no or few symptoms but I am more amazed when later I see satisfaction with radiographic appearances of much graver lesions and serious mutilation

The boosting of radiology has been responsible for the serious deterioration of clinical medicine forecast by all my teachers and other leaders of the profession of their period Radiology without prior adequate clinical examination is bad radiology and should be cut out ruthlessly [4]

Since this service was introduced I have found it difficult to reconcile the extravagant calls on the X ray department (yes, and all other ancillary services) for patients admitted to hospital either because they are ill or for investigation and the almost complete lack of such calls by those who carry out the full complement of domiciliary visits

There are other sources of waste. In the first world war and after the Office of Works had an efficient technical staff which economically serviced and repaired all X-ray equipment. Now much more expensive equipment still capable of efficient service, is scrapped and replaced The administrators of the N H.S appear to be more concerned with show than with quality of service

Birmingham.

JAMES F BRAILSFORD

DEAFNESS FROM DIHYDROSTREPTOMYCIN

SIR,—We have seen 3 examples of the deafness, described in your annotation last week following treatment of tuberculosis with dihydrostreptomycin:

CASE 1—Girl, aged 18 years. Pulmonary tuberculosis. Treatment: January 1950 streptomycin 0·5 g twice daily for 8 weeks. May 1950 dihydrostreptomycin 1 g daily for 3 weeks. Onset of deafness in July, 1950 now severe (voice heard only at meatus)

CASE 2—Girl aged 3 years Tuberculous peritonitis. Treatment streptomycin for 2 months Dihydrostreptomycin for 4 months (May–August, 1950) Onset of deafness in September, 1950; now severe (hears sounds only)

CASE 3—Boy aged 5 years. Lower nephron syndrome and bronchopneumonia. Treatment: *dihydrostreptomycin* 2 g daily for 12 days in August, 1950 Deafness first noted in December 1950; now moderately severe (hears voice at 1–2 feet)

It will be noted that none of these patients had meningitis It seems very likely that their deafness is a result of the toxic action of dihydrostreptomycin No cases of deafness after streptomycin treatment have been seen in this unit except when the treatment was given for meningitis.

We should like to draw attention to the importance of immediate rehabilitation in acquired deafness of this type. In a series of cases of deafness following treatment of meningitis, auditory training has been commenced while the children were still in hospital In spite of previous opinions to the contrary the results have been excellent and some of these children are already receiving education in ordinary hearing schools.[1]

London, W 1

A S WALKER
EDITH WHETNALL.

ECLAMPSIA AND PRE-ECLAMPSIA

SIR—I should like to congratulate you on providing among your original articles a sequence of obstetric pearls. Not the least of these is last week a contribution by Dr Hamlin

He has brought forward proof that increase in weight is the most important and early sign of pre-eclampsia in the primigravida and that if this increase is dealt with promptly by diet, salt restriction and rest, the onset of eclampsia can be prevented. Continuing observation providing similar results over the next few years would make his thesis irrefutable

He ascribes the weight-gain to obesity and to œdema—a later complication—and suggests that eclampsia is probably of metabolic origin The evidence on this score, however is slender Fat deposition and water retention have so far not been distinguishable as factors responsible for increase in weight in pre-eclampsia, and there does not appear to be any evidence on this score in Dr Hamlin's article Even if obesity can be distinguished and a metabolic error established the fact that it largely lacks ætiological significance in the multiparous state would discount its primary importance in the causation of the syndrome If in relation to toxæmia, pre-existing hypertension serves as a parallel pre-existing obesity should increase the tendency to the disease But of this there is no evidence In view of the fact that the treatment given by Dr Hamlin is directed to the amelioration of water retention by salt restriction and rest and also of the recent findings of Prof De (Dec. 15) that eclampsia is associated with the Oxford shunt—a renal state that could explain the symptoms of pre-eclampsia—it may well be that the value of the measures adopted is that they help to readjust the milieu intérieur, the disturbance of which Dr Hamlin shrewdly suspects

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[1] Welbourn R. B. *Gastroenterologia Basle* 1951 76 361 *Proc R. Soc Med* 1951 44 773

[2] Glazebrook A J Welbourn R B *Brit J Surg* (in the press)

[3] *Brit med J* 1949, ii 74

[4] Brailsford J F *Brit J Radiol.* 1951 24 315

[1] Walker A S *Rep Inst Laryng Otol* 1951 1 276

Bykov, employing conditioned reflexes, has demonstrated that hormonal and nervous influences together lie behind certain renal functions The metabolic changes suspected by Dr Hamlin may be explicable on such an assumption

London, W 1 JOHN SOPHIAN

"UTILICON"

SIR,—In reply to Dr Penman's inquiry last week, 'Utilicon' is a trade name for a utility convertible ambulance How official English does grow!

Royal Albert Hospital,
Lancaster D H H THOMAS

SIR,—A utilicon van is familiar to all Service men and women It is a type of body known today as "shooting brake" or (in the U S A) "station waggon," and can be used for conveying persons or goods

London, E 17 ST GEORGE B. DELISLE GRAY

GENERAL PRACTICE, THE HOSPITALS, AND THE FUTURE

SIR,—I feel that there is a fallacy in Mr Sangster Simmonds's argument (Jan 5) that further beds can be provided at less cost than in the major hospitals by opening more continuation hospitals, convalescent hospitals, &c

Assuming that there is no difference in the quality of the food and other services, the difference in cost of providing for these patients must be due to the expense of the various investigations and drugs In convalescent homes any investigations required are usually carried out at nearby hospitals and are not charged to the institution having the care of the patient The seeming differences in cost are therefore really a matter of book keeping. Wherever beds are provided their cost will be the same for the category of patients concerned

Chest Clinic,
Harrow Middlesex R GRENVILLE-MATHERS

PAROXYSMAL TACHYCARDIA IN INFANCY

SIR,—I read with interest the article by Dr Edmunds in your issue of Dec 15.

Paroxysmal tachycardia is rare in infants, and the general practitioner's difficulty in diagnosing the disorder must be great It is likely to have been present for some time before the pædiatrician sees the infant, and then exsiccosis and dystrophy from feeding difficulties may veil the underlying condition The prognosis may be bad, especially if the attacks recur

I saw a baby girl, aged 3 weeks, the 5th child of healthy parents, who had paroxysmal tachycardia The mother said that immediately after the infant's birth its heart was beating very fast, after crying or feeding the speed seemed to be still greater and slight cyanosis ensued

The child was admitted to hospital with fever and slight exsiccosis, acute dyspepsia had been diagnosed The heart rate was about 200 per min There was no cyanosis, and clinically no other abnormalities were found Radiologically the cardiac outline was normal, and an electrocardiogram showed a heart rate of 210 per min with normal complexes The blood count was normal

Under treatment with 'Digalen,' the heart rate was restored almost to normal, and the Wolff Parkinson White syndrome did not develop Within a week, however, tachycardia returned, causing cyanosis and pulmonary œdema, and the patient died

In this case idiopathic hypertrophy of the heart and other congenital abnormalities were not found It seems that the child was born with paroxysmal tachycardia, which stopped and recommenced spontaneously During the attacks cyanosis appeared and feeding became difficult The fever was apparently not due to infection

Hilversum, Holland D P R KEIZER

CORONARY RESERVE

SIR,—I am glad to note that you now say in an annotation of Dec. 20 that the older view of the thrombotic closure of the coronary artery is no long tenable Some time ago I wrote[1] that in a l experience of necropsies in cases of death from coro disease I had never seen a coronary thrombus, thou carefully looked for, and I pleaded for the t "coronary thrombosis" to be replaced by "coro occlusion" During 1951 among my necropsies t have been 42 deaths from coronary disease, and no of a coronary thrombus

The usual site of occlusion is in the artery on the front of the heart running down to the apex just to the left of the interventricular septum and its branches over the left ventricle Occlusion is of 3 degrees, according to the site

1 The smaller branches over the surface of the le ventricle, causing minor attacks with anginal pain

2 The larger branches running down over the surface o the interventricular septum, causing severe attacks of angina and necessitating more or less prolonged rest in bed.

3 Occlusion within $1^1/_2$ in of the opening of the coronary artery into the aorta, causing rapid death.

No 1 is always recovered from No 2 is often fatal after a week or so, but is often recovered from after a few weeks' rest and is frequently followed by a fatal attack after an interval of some months up to a year or two In necropsies on cases of no 3 it is usual to see evidence of conditions of the arteries as in nos 1 and 2 and also small areas of fibrosis in the left ventricle muscle But sometimes there is only the occlusion in the upper $1^1/_2$ in, and these are probably cases in which the patients die in their first attack of angina

In all cases the occlusion is caused by atheromatous matter accumulating in the lumen of the artery. Frequently there is calcification of the walls as well Sometimes there is calcification without occlusion, and in these cases the lumen of the artery is often larger than normal and rigid (pipe stem) These patients have usually not died of heart trouble Atheroma fairly often occurs without calcification

I think it is important to recognise that coronary artery atheroma cannot be directly diagnosed It can be inferred from (*a*) symptoms (anginal pain, dyspnœa tightness, feeling of impending death), (*b*) electrocardiogram, indicating damaged heart muscle, and (*c*) effect of nitrites (*a*) and (*c*) together are probably the most important

For some time the patient regards the pain as due to flatulence or indigestion A common cause of similar pain is mild gall stone colic, which is often diagnosed as angina and vice versa The electrocardiogram is less reliable as it does not show the state of the coronary arteries but only any muscle damage, which may or may not be due to coronary disease Radiographs by special methods can show calcified coronary arteries but not atheroma It does not appear that there is at present any direct way of diagnosing coronary atheroma and therefore of treating it before it has damaged the heart muscle

It seems that there is no known treatment for atheroma The recent work on cholesterol levels in the blood perhaps points to a means of earlier diagnosis and of prophylactic treatment The much greater consumption of milk in recent times may be a source of the cholesterol, as suggested in the Scandinavian statistics. It is significant that the age-incidence of coronary atheroma deaths is falling A few years ago cases reported in patients under 65 years of age were rare Now they are being reported not very infrequently in the 30s I have seen atheroma in the coronary artery in a boy of 10 who died from drowning At the same time a eneration is growing up who have had much milk drinking in school.

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[1] Pitt W O *Lancet*, 1946, ii, 884

Now that the idea of coronary thrombosis is untenable t is to be hoped that the use of anticoagulants in these cases will be reviewed I am told that the pathologists find wholly varying coagulation times in coronary disease—some increased and some diminished If so this indicates that the coagulation time is not related to the coronary disease—why should it be? There is some reason to think that the anticoagulants may do as much harm as good in these cases.

Whether the disease is in the smaller or middle branches or the terminal part of the artery it has started from an early deposit of atheroma and is then steadily progressive until the final closure which may be quite sudden or more gradual It does not depend on the physical activities of the patient but on the supply of cholesterol and the capacity to deal with it—perhaps analogous to sugar and diabetes

The only rational treatment for attacks is morphine for sedation, atropine for the œdema of the lungs which is invariably found post mortem and nitrites for vasodilation to relieve strain on the heart Cardiac stimulants are probably contra indicated.

In this increasingly common cause of death research is needed into (1) early diagnosis of atheroma of the coronary artery (i.e. before any heart muscle damage, which alone is what the electrocardiogram reveals) and (2) prophylaxis and treatment of atheroma

Worthing W O Pitt

IN SCANDINAVIA

Sir,—In your issue of Dec. 15 Dr R. E Smith, who visited Scandinavia last summer expresses very nicely his admiration for the new pædiatric clinic in Oslo (part of the Rikshospital, comprising the various university clinics) and takes the building of this new clinic as a token of the Norwegians faith in their present medical system

We Norwegians are certainly very proud of the modern parts of the Rikshospital and in particular of the new pædiatric clinic, which certainly is one of the finest in the world and we greatly appreciate the admiration expressed by visitors I feel, however, that it is only fair for me as a Norwegian to point out one fact which should be admired even more than the clinic itself—namely that this particular clinic is a gift to Norway from the people of our neighbour Sweden

Immediately after Norway s liberation from the Nazi occupation the Swedish people made a large gift to Norway—and this children s hospital was part of it The children s hospital in Oslo is thus also a token of neighbourliness.

Rikshospitalet,
Oslo

John Caspersen
Director

SICKNESS BENEFIT: SOME ANOMALIES

Sir —The management of personal affairs on a large scale which is a necessary feature of the Welfare State, requires that the individual should conform to a certain minimum of regulation The rules, however should be elastic enough to meet various needs and simple enough to make compliance easy Personal experience brings these points home and my own relates to sickness benefit

The intention of Parliament was to give financial relief to the sick person and his family at the moment when his income from work was cut off and at the same time to see that the insurance funds were not depleted by unjustifiable claims. I have no criticism to offer of the National Insurance staff, nor of their explanatory leaflets nor of the demands for information in the form of claim received after submission of the first medical certificate (which include the date of birth of all children and the numbers of family allowance book and National Insurance) But I think it far from obvious that this information should have to be given at the time of illness, when everyone is anxious and preoccupied I cannot believe that Parliament intended that failure to submit the claim in the first few days of illness should lead to loss of benefit yet that is what is happening as correspondence in the *Manchester Guardian*[1] has lately shown In one case cited a man was deprived of benefit for six months because no claim had been sent at the right time, and the number of cases in which benefit is lost for short periods must run into thousands each week Surely a simplification of procedure is called for If the doctor certifies, *at any time* up to any six months from the onset of illness, that his patient has been unfit for work between dates X and Y (which he will have noted in his own sickness records), and also in case of necessity gives an immediate certificate to authorise interim payment, it should be possible for the N I office to give prompt relief to a family in need and also to be sure that no excess payments are made

This brings me to a second criticism, which could surely have been foreseen and guarded against I am one of some hundreds of thousands in public services, who are entitled during illness, to full pay It should be unnecessary for me to claim sickness benefit which is not intended as a supplement to income but as an insurance against loss of income National Health Service regulations, therefore, declare that I am entitled to full pay, less any sums ' receivable ' from National Insurance. This however is interpreted in the sense that I must go through the procedure of claiming and receiving benefit, or that I shall be fined the amount due, *whether I received it or not* and a special memorandum from the treasurer of my regional hospital board tells me that I must make sure that I receive all that is due, in respect of children &c. since he will deduct from my salary this amount His memorandum also demands that I send him *at the time of sickness* a note of my marital status and the number of dependent children under 16 and at the same time submit the first medical certificate of sickness (which is of course due at the local insurance office) he also requests that I send him " forms B.S 12 which are sent by the Ministry of National Insurance with each payment of benefit."

Now the purpose of the N H S regulation is merely to secure that I do not receive full salary as well as sickness benefit One Government department, however the Ministry of Health wishes to reduce its expenses by the amount due to N H S workers from another Government department, the Ministry of National Insurance It is entirely a question of book keeping between one department and another but the method adopted involves my wife or me at the time of sickness in much tedious form filling and postage, at the risk of losing some £3 a week for the period of illness, and also creates weekly work in the offices of the treasurer of the regional board and of the National Insurance Ministry Ignorance of the regulations has certainly resulted in losses to workers of all grades in the N H.S and the ignorance is hardly surprising since no such claims were demanded of Government employees before 1948

If this tedious business (involving potential injury) affected only a few people, it would still be worth simplifying the procedure; but it appears to affect a great many who work for central or local government authorities including doctors receiving a salary and the amount of time and trouble involved must be great All that seems necessary is that a doctor s certificate covering the whole period of illness should be produced, on pain of deductions from salary This certificate would be the employing board or committee s authority, as a matter of book keeping for demanding to be reimbursed by the Ministry of Insurance for the amount of sickness among its employees Such *adjustment* of accounts could be made yearly or half-yearly no direct payments would be made by National Insurance to anyone working for the Government, and the procedure would be as easy as that of P A Y E

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[1] Dec 10 1951 p 4 Dec 17 p 4 Dec. 21 p 4

I understand that all a Post Office employee has to do when ill is to send a weekly or monthly medical certificate to the Post Office, which later claims appropriate sums from the Ministry of National Insurance Why should not regional boards and management committees do the same?

Bickley, Kent. DUNCAN LEYS

THE POTENTIAL SUICIDE

SIR,—The opening sentence of your annotation of Dec 1 (p 1026)—"One of the most momentous questions facing a doctor who has the care of a mentally ill person is whether his patient is likely to commit suicide"—may give some practitioners a false sense of security Too frequently suicide, or possible suicide, is associated in the physician's mind with mental illness, and mental illness, or even nervous illness (i e, neurosis), in turn with major deviations in behaviour, thoughts, and feelings The point which I tried to document with over 90 consecutive cases in the paper that you reviewed, listing the presenting complaint in potentially suicidal patients, is this Even vague or minor signs of depression or its accompaniments should lead the alert doctor to think of suicidal risk and apply the whole battery of clinical criteria described in my paper to rule out a serious risk

New York 21, N Y JOHN F OLIVEN

TREATMENT OF SUBACUTE INTESTINAL OBSTRUCTION

SIR,—The diagnosis of subacute small-bowel obstruction is not the least difficult of the problems confronting the abdominal surgeon

On occasion the straightforward conditions leading to a diagnosis of obstruction may be elusive Vomiting may not be present or marked, constipation may not be absolute, and in the early stages enemata may result in the passage of fæces and flatus The spasms of colic may not be severe, and the time relations of their onset may be intermittent The patient's condition may belie the severity of his lesion, and he may appear from time to time to be improving Distension may be later in onset than would be expected from the lesion ultimately found An interesting feature that may on occasion be noted is the presence on percussion of spurious shifting dullness, which may be associated with a fluid thrill This is probably due to the fluid content of the grossly distended proximal bowel Such variability of symptoms may lead to a delay that is dangerous in view of the underlying lesion

The history of these patients usually draws attention to a previous operative episode, and it is not unnatural that such episodes should sometimes produce undue bias in the mind of the examining surgeon Such associations may lead to the diagnosis of partial obstruction and the adoption of temporising methods such as the use of a Miller Abbot tube In my experience such conditions as carcinoma of the rectum, carcinoma of the ovary, recurrent volvulus of the sigmoid colon, and operations for their cure have been salient features in the histories elicited

The symptoms often start with colicky abdominal pain, associated in the early stages with some increase in the bowel sounds Initially there is usually no vomiting, nor is constipation absolute at this time Distension progresses, and as it does so the colicky pain diminishes in intensity and becomes more intermittent At the same time the bowel sounds become less pronounced, nor is visible peristalsis usually obvious at this stage

When the abdomen is opened the small intestine found to be grossly distended, and its thin walls constitu a grave hazard to necessary operative [illegible] Location and treatment of the causative lesion usual requires both partial evisceration of the distended bow and its ultimate replacement, and both these procedures, however carefully done, afford unwelcom opportunity both for general and local injury

The late Prof G Grey Turner, in a characteristicall helpful letter (dated Jan 12, 1950), wrote

> "How nice to get such an interesting letter Of cours I am very familiar with the type of case you mention t me, and for years have been very much concerned about the proper management In my view the only treatment mechanical obstruction is operative, but we want to b certain that the trouble is mechanical before the a is opened If there is any doubt about it, then I agree with you that we should try all other means and shou not forget that temporary enterostomy (always bringing th tube through the omentum) has an important place in th management of certain classes of cases Your statemen about the trauma to the bowel when the support of th parietes is removed brought back many rather painfu memories, and for years and years one has felt that it is mo important to avoid handling distended intestine if at possible"

In a case lately under my care the distension wa associated with tension necrosis extending 2 feet alon the antemesenteric border of the gut

The patient's general condition was poor, and her abdomin capacity was reduced by marked scoliosis Numerous per toneal adhesions were present, and it was difficult to locali the cause of the obstruction In this case partial evisceratio could not be avoided, and there was a corresponding deterior tion in the patient's condition before a gangrenous loop intestine was defined and delivered Return of the distend bowel would undoubtedly have caused further regressio and to avoid this the contents of the intestine were imm diately evacuated through a temporary enterostomy in t gangrenous loop The bulk of the bowel was then return to the abdomen, leaving exposed only the gangrenous lo with about 5 in of viable bowel on either side The abdom was then completely closed round this loop

At this stage the patient's condition was poor and givi cause for considerable concern. However, the operation w continued Resection of the gangrenous loop was performe and end to side anastomosis made between the distend proximal loop and the normal distal loop, the free end of t "T" being used for an enterostomy, utilising a Paul's tub This bowel, of course, was left outside the abdomen.

The patient made a good recovery following this operatio and it is interesting to note that she passed flatus two da later The enterostomy drained fairly freely, especial during the first forty eight hours It can be conclude therefore, that the anastomosis was working satisfactoril and that some of the bowel contents were finding their wa into the distal loop

Four days after the first operation the patient was agai anæsthetised and the ileostomy closed The anastomos looked satisfactory, and the whole of the bowel loop wa returned to the abdomen, a small drain being placed dow the site of the closure The patient stood the operatio very well, and in spite of a small leakage along the tube fo a few days she made a satisfactory recovery and was abl to eat normal diet a fortnight after the first operation.

There is little that is new on the technical side o surgery, and I hesitate to claim this procedure as a new one It is not mentioned in the standard textbook of surgery, and in this case it certainly saved the life of a patient with probably the most dangerous form o intestinal obstruction

The advantages of this procedure are considered to be as follows

1 The abdomen is closed prior to the anastomosis and resection of the gut, and only very light anæsthesia is necessary for the extraperitoneal procedure In the patient whose case history is reported there was rapid improvement of the clinical condition even while the resection and anastomosis were being performed

2 The anastomosis was performed with somewhat unhealthy bowel and exteriorisation has obvious advantages under these circumstances

3 Some of the difficulties that have been experienced with the Paul Mickulicz type of resection for gangrenous intestine especially in cases of intussusception, are reduced because some of the contents of the bowel pass onwards down the distal loop

4 Compared with the Paul Mickulicz closure the second operation in this case was relatively easy and quickly performed and did not worry the patient unduly

5 Draining away the highly infected contents of the distended loops, and preventing reabsorption in the lower healthy bowel may be factors of importance

6 The anastomosis tends to reduce the biochemical disturbances that are *so obvious in the presence of a fistula* These disturbances are as is well known, severe with intestinal fistula of children

Newcastle upon Tyne   DENIS HINDMARSH

REACTION TO PROCAINE PENICILLIN

SIR,—In your issue of Aug 4 Mr Batchelor and his colleagues described alarming reactions to intramuscular injections of an aqueous suspension of procaine penicillin I have lately seen a somewhat similar case.

A 53 year-old mechanic had a large boil on the knee Subcutaneous injection of 50 mg of pethidine was followed a few minutes later by intramuscular injection of 300 000 units of procaine penicillin in 2 ml of saline I am confident that this injection was not given into a vein.

Immediately the patient felt dizzy and lay down. His respiration became stertorous, and he did not respond to questioning; after about 1 minute he was deeply unconscious The radial pulse and the apex beat were impalpable and I could not hear heart-sounds. The eyes were turned upwards with lateral deviation and the body became stiff as in the tonic phase of a fit; but no clonic phase ensued

After about 2¹/₂ minutes when I was considering giving an intracardiac injection of adrenaline the heart-beats returned, at first irregularly at intervals of about 5 seconds, and then more regularly Respiration began again, and the patient regained consciousness. He looked pale and shocked for about half an hour After an hour he got up He has had no ill effects. On questioning he denied any previous attacks of unconsciousness.

Injection of procaine penicillin seems to be more dangerous than most of us have realised

Ramat Gan, Israel   A YUVAL.

CETRIMIDE AND PS PYOCYANEA INFECTION

SIR,—Postoperative *Pseudomonas pyocyanea* infections of the eye are unfortunately not very rare and often lead to loss of sight In this connection I would like to draw attention to the preoperative use of 1% cetrimide in aqueous solution as a skin antiseptic. It is generally believed that such a solution is effective against *Ps pyocyanea* even in the presence of moderate amounts of organic matter

A 1% solution of cetrimide in 70% alcohol is stated to produce satisfactory sterility of the skin within two minutes Gardner[1] however found that a 2 5% watery solution failed to produce sterility in 4 out of 6 sterility tests after application to the skin surface the tests being performed after one and a half minutes exposure to the antiseptic. This was in sharp contrast to the action of the well established skin antiseptic—2% iodine in 70% spirit—which led to sterilisation of the skin in a quarter of a minute in 99 9% of tests performed

The refractoriness of *Ps pyocyanea* to cetrimide is well known to bacteriologists,[2] and in fact this substance is even used in a concentration of 1% in nutrient agar for its selective enrichment[3]

I found that Ps pyocyanea survived in a 1% saline solution of cetrimide for at least fifteen minutes. A similar concentration in distilled water allowed survival of a moderate inoculum for two minutes, but was apparently lethal within five minutes.

Conditions on the skin surface after the application of a watery solution of cetrimide approximate more closely to those of a saline solution, and I feel that this may be an explanation of the relatively poor efficiency of 1% aqueous solution of cetrimide for skin sterilisation.

I would be very interested to learn of cases where postoperative *Ps pyocyanea* infections have occurred after application of cetrimide as a skin antiseptic

Bacteriological Department   C R. ROBINSON
St George's Hospital Medical School
London S W 1

TASKS FOR THE M O H

SIR,—Your sympathetic leading article last week will be read with interest by medical officers of health who have had great difficulty in getting reorientated after the changes of the ' appointed day ' in 1948 and most of whom consider that the sense of purpose and direction will not be fully restored to public-health work until the promised reform of local government functions and boundaries comes about—that is, assuming that public-health work will best be carried out in the future in the framework of local government. There is of course a school of thought which hopes for a completely new form of local authority which would administer hospital, general practitioner, and preventive medical services in a single unit Meanwhile, one cause of anxiety—that the trickle of new entries to the public-health service would dry up entirely—has been somewhat alleviated by indications that some schools of public health have this year increased numbers of D P.H. students who intend to work in British health departments.

You also touch on the question of research Since the war there has been a great increase in inquiries and surveys, by bodies both official and unofficial which have collected their material largely through the staffs of local health departments. The former attitude of the council of this society was that it should not seek to sponsor such inquiries since this might seem to interfere unduly with the discretion of individual medical officers of health in deciding whether their staffs should assist in the collection of data. Lately however there has been a change of opinion Some four months ago the council appointed a special advisory committee on research, whose functions have been defined as follows:

(*a*) Its main function should not be to initiate research or to conduct actual inquiries The Society of Medical Officers of Health has not the staff or resources for such purposes, and there are bodies and foundations—e g., the M.R.C., Nuffield Foundation, university departments and institutes—which are equipped and intended for them.

(*b*) Its main function should be to act as a " clearing house for researches and inquiries which involve the assistance of M.O H.s and the staffs of public health departments; to inform and advise members of the society who request guidance as to research projects and to try and avoid duplication and overlapping in research

(*c*) Large-scale inquiries which make calls on the aid of public health departments should be actively co-sponsored by the society which should have direct representation on the organising committees, if the society's committee considers that they will serve a useful purpose

(*d*) No action taken by the society's committee should infringe the discretion of any M O.H. to make his own decision whether or not his department shall coöperate in any inquiry

This committee has already received information of a number of interesting projects in which local health departments are taking part and is seeking to exchange information centrally with other bodies concerned in the kind of research work which the public health service can assist.

We hope that this committee may prove one of the most useful and productive activities of the society

Society of Medical Officers of Health,   G L C ELLISTON
Tavistock House South,   Executive Secretary
London W C 1

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[1] Gardner A D *Lancet* 1946 i 683

[2] Williams R E O, Clayton-Cooper B Faulkner H C Thomas H F *Ibid*, 1946 i 787

[3] Harper G J Cawston W C, *Bull Inst med Lab Tech* 1945 11 40

Obituary

EDWARD CECIL GORDON MADDOCK

C I E , M D Edin , F.R C.S.E

Lieut -Colonel Edward Maddock, who died on Jan 6, was remarkable for his versatility During his service in the Indian Medical Service he was a civil surgeon of unusual eminence, and on his return to this country he won fresh distinction in microbiological research

He was born in 1876, the son of the late Canon H E Maddock, rector of Partington, and he was educated at Rossall School In 1898 he graduated M B at the University of Edinburgh, and the following year he joined the I M S Between successive tours of duty he took the D.P H and D T M. in 1906, and the M D and F R C S E in 1911 During the first world war he served with the Y Indian General Hospital, and after a period as D A D M.S at Bombay he took charge of the 160th Indian Combined Field Ambulance Later he became civil surgeon and superintendent of the B J Medical School at Poona. It was during this period that he had to decide, in the face of an acute political situation, whether to operate on Gandhi during a hunger-strike He removed the Mahatma's appendix and steered him through a convalescence which was stormy in more than one sense

In 1926 Maddock retired from the I M S and began working at the National Institute for Dairying Research, Shinfield In 1933 he received a Prophit scholarship from the Royal College of Physicians to study the survival of tubercle bacilli in soil He was also for many years honorary secretary of the Certified and Grade A Tuberculin Tested Milk Producers' Association

The late war was for him an opportunity for continued service, and of his work at the Ministry of Health W H B , to whom we are indebted for much of this memoir, writes "The war came at a time when most men of his age would have been content to remain in retirement Not so Maddock He joined the epidemiological division at the Ministry , and during the next five years he contributed several studies, particularly on trichinosis and the sequelæ to meningococcal infections treated with the sulphonamides During the bombing of London he was in the shelter team which kept liaison between the borough medical officers and the Ministry This involved almost nightly visits to the shelters and many unpleasant tasks The bombs did not stop Maddock His leadership and courage under circumstances which would have daunted many a younger man were a constant inspiration, but there was nothing ostentatious about him His friendship was quiet, but deep and enduring."

In 1915 Colonel Maddock married Miss Cecilia Cockburn Hood, who survives him

WILLIAM HENRY MILLER

M D Lond , F R C S

Dr W H Miller, senior surgeon to Bedford County Hospital, died on Dec 31, at the age of 70

He was educated at William Ellis School in London and Guy's Hospital, where he qualified in 1906, taking his M B Lond with honours the following year After acting as house-surgeon at Guy's, he became registrar at the Samaritan Hospital and later clinical assistant at the Soho Hospital for Women. In 1911 he took his M.D with first-class honours and the F R C S He practised in Enfield for a short time before joining the late Dr Hartley in Bedford, where after the 1914–18 war he took over the practice

Always interested in surgery, Dr Miller was appointed assistant surgeon to Bedford County Hospital in 1924, and in 1932 he became senior surgeon and chairman of the medical staff committee When the National Health Service came into being in 1948 he was appointed consultant and he continued to do surgical work at hospital till March, 1951 During this time changes took place in the work of the hospital, and it largely owing to his inspiration and enthusiasm that hospital was brought so thoroughly up to date. first he was interested in gynæcology, but later specialised in gastric surgery He was always keen give his registrars and housemen a really practi training, and many will be grateful for his help encouragement As head of a large general pr he again led the way by setting his partners a standard and example He was a valuable member the Bedford group hospital management committee and he played a leading part in the development of th new service He was also medical adviser to th Bedfordshire Hospital Services Association

A colleague writes "Dr Miller was a strong and many of us learned to rely on his judgment not in medical matters but in other directions as well. H opinions were decided and never indefinite, but they w mellowed by a real humanity His friends and h patients knew how charming and friendly he was, were often delighted by the twinkle in his eye. He w a man who never spared himself, and he inspired to work with him One felt that he really cared for welfare of those for whom, and with whom, he worked and he would take endless trouble to promote interest, both by sound advice and practical help H was a great fighter for things he thought right, and w all admired him for it"

In 1904 he married Miss H M Zimmerman, wh survives him with a son and a daughter

PERCY BERNARD SKEELS

L.M S.S.A

Dr P B Skeels, coroner for the Metropolitan distric of Essex and formerly deputy coroner for London, die on Jan 5 He was admitted a solicitor in 1905 and too his medical qualification from Guy's Hospital twent years later In 1936 he was elected to the council of th Medical Protection Society, and in 1949 he became a vice president. P H. C , one of his colleagues, writes "Dr Skeels attended a meeting of the council las month, when he seemed to be in his usual health an good spirits His quiet, friendly manner had endeare him to us all , but his loss will be felt, not only o personal grounds, but also because of his work for th society His advice was always valuable and to th point, especially on legal matters and financial problems

Prof LUDOLPH BRAUER

Ludolph Brauer's name will always be associated wit the modern concept of the treatment of tuberculosis, fo he was a leading pioneer in the development of surgical lung collapse Though the first experiments with partia rib-resections for permanent lung collapse go back t de Cérenville (1885) and his successors in the 1890s these tentative operations did not give satisfactory results and it was Brauer who first conceived the idea of extensive rib-resections for the adequate control of extensive cavitating lesions The first successful thoracoplasty along these lines was performed by Paul L Friedrich in 1907 Together Brauer and Friedrich, guided by trial and error, developed the modern thoracoplasty operation (1911) which was later modified by Wilms (Heidelberg) and Sauerbruch (Munich)

Brauer was born in 1865, the son of a West Prussian landowner He studied medicine at Bonn, Marburg, Munich, and Freiburg, and during these student years he contracted pulmonary tuberculosis His illness threatened to end his professional career, but, against all expectations, he recovered after a course of treatment at Turban's sanatorium in Davos Of his illness Brauer himself later wrote "Why and how I recovered, I don't even know today I have seen later many similar cases, but all of them succumbed" After qualifying in 1892—by his presence of mind rather than by detailed knowledge, he declared—he decided first to widen his experience by touring the world as a ship's surgeon. He always insisted on the importance for a doctor—particularly for a university teacher—of wide general knowledge and of great experience of life Without such a background, he ntended; the most thorough training as a specialist cks the essential foundation

Brauer started his academic career as assistant to the eurologist Erb in Heidelberg From here he moved to arburg where he held the chair of medicine and where e took a special and keen interest in tuberculosis. His rilliant career reached its zenith with his appointment the directorship of the Eppendorfer Hospital at amburg He was the founder and editor of *Brauer's eiträge zur Klinik der Tuberkulose*, and he founded a umber of free research institutions, the most important f which is the Deutsche Forschungsanstalt für Tuberulose which he regarded as his own personal creation. is friends and collaborators have perpetuated his emory by giving the institution the additional name f Ludolph Brauer Institut.

Professor Brauer died on Nov 25 in Munich not long fter his return from Istanbul where—at the invitation f the Turkish government—he had lately organised a ew research institution

E G W.H.

Appointments

DREWITT A. H M.R.C.S. asst. chest physician Northfield Sanatorium and chest clinics in the East Riding area

Hospital for Sick Children Great Ormond Street London:

COMBE W A D M.R.C.S. anæsthetic registrar

DYKE ELIZABETH B.M. Oxfd D C H asst. M.O at Tadworth Court

JOLLEYS AMBROSE M B Lpool F.R.C.S: senior surgical registrar

KLIMAN M R. B.A., M.C.P & S. Sa k. F R.C.S house-surgeon.

SHIRKEY, M J M.B. Birm. M R.C.P house-physician

SIMPSON KENNETH M.B. Lond M.R.C.P house physician.

The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H S hospital posts we advertise, unless otherwise stated Canvassing disqualifies but candidates may normally visit the hospital by appointment

Diary of the Week

JAN 20 TO 26

Monday 21st

ROYAL EYE HOSPITAL, St George's Circus, Southwark, S E 1
5 P.M. Dr T H Whittington Refraction Work in the Aged

Tuesday, 22nd

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene, Keppel Street, W C 1) Prof G L Brown F.R.S. Involuntary Nervous System.
INSTITUTE OF DERMATOLOGY St John's Hospital, Lisle Street W C 2
5.30 P.M. Dr W J O'Donovan: Hysteria Cutis.
EUGENICS SOCIETY
5.30 P.M. (Burlington House Piccadilly W 1) Dr R. W Parnell: Recording Human Constitution
UNIVERSITY OF ST. ANDREWS
5 P.M. (Medical School Small's Wynd Dundee) Mr. L H. Gray PH.D Biological Actions of Ionising Radiations

Wednesday, 23rd

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr R. W Riddell Mycology—Moniliasis, Torulosis
N E METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY
3 P.M. (London Chest Hospital Victoria Park E 2) Mr T Holmes Sellors: Congenital Abnormalities of the Chest. Dr K. F W Hinson: Pathological demonstration.

Thursday 24th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. Professor Brown Involuntary Nervous System
ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner S W 1
4.30 P.M. Dr J H Paterson Neurology lecture-demonstration
INSTITUTE OF CHILD HEALTH Hospital for Sick Children Great Ormond Street W C 1
5 P.M. Sir Hugh Cairns Surgery of the Brain in Childhood
ST JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY 5 Lisle Street W C 2
4.15 P.M. Demonstration and discussion of clinical cases
MEDICO-LEGAL SOCIETY
8.15 P.M. (26 Portland Place W 1) Mr William Latey K C: Testamentary Capacity

Friday 25th

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr I D Samman Xanthoma and Necrobiosis Lipoidica
INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY
5.30 P.M. (London School of Hygiene) Dr B G B Lucas: Anæsthesia for Cardiac Surgery
MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES
7.30 P.M. (11 Chandos Street W 1) Dr Gordon Horne Possible Applications of A C T.H and Cortisone in Syphilis
UNIVERSITY OF EDINBURGH New Buildings Teviot Place
5 P.M. Prof Ancel Keys PH D Serum Cholesterol Giant Molecules and Atherosclerosis (Macarthur lecture)

Notes and News

THE DISTRICT NURSE AND VOLUNTARY EFFORT

ADDRESSING the Hampstead District Nursing Association recently Dr D H Geffen medical officer of health for St Pancras, spoke of the many thousands of people in this country who were able to avoid going into institution or hospital because of the work of district nurses Extending home nursing facilities was one way of easing the shortage of hospital beds

The average person, in Dr Geffen's view would sooner be restored to health in his own home than go into hospital As for the aged the first need was to see what could be done to make them happy and comfortable at home He had many requests from almoners, councillors, doctors and social workers to investigate conditions under which aged people were living and often it was expected that he would secure removal to hospital or institution But this was the last thing the patient wanted "I am called upon to help the aged person primarily" said Dr Geffen, "and not those who think he ought to be removed or institutionalised. I use the word 'institutionalised' on purpose It is a horrid word and it denotes a horrid outlook"

Dr Geffen thought it essential that bodies such as the Hampstead District Nursing Association should be fully supported by the residents of the district they served. A large proportion of the expenses were met from municipal funds; but the proportion contributed by voluntary effort should be high enough to ensure the association's continuity and enable its voice to be heard and listened to Successive Ministers of Health had emphasised the importance of preserving voluntary effort and Dr Geffen felt it to be particularly necessary to preserve it in all services touching the individual The best type of personal service was one that was local inspired by the personal desire of local people to help those in need and one that had the support of the local authority with its solid financial backing

ROCKEFELLER FELLOWS

DURING the 1914–18 war the Rockefeller Foundation began in a quiet way to distribute a few fellowships But with the years the scheme has grown until by the end of 1950 there were 6312 people from seventy five different countries who had held fellowships, costing in all $10 million Of these fellowships 2560 were awarded through the division of health to the doctors, nurses, and engineers who were needed to carry out the division's disease control campaigns while in choosing the 1203 fellows in the medical sciences emphasis was laid on the promotion of research With this distinguished record it is no wonder that the foundation has been encouraged to publish a directory[1] of the men and women whom it has chosen and backed The brief biographies giving the appointments which the fellows now hold support the foundation's judgment and the roster of fellows by country and field of interest at the end of the directory is convincing proof of its breadth of outlook and scope of usefulness

University of St Andrews

The following have been successful in the final examination for the degree of M.B., CH.B

D M Alexander R. H Arnold J S Bain H J Barclay D G P Brown, Betty K. Dean, H R Foreman Elizabeth H L. Hay, R. L. Kelly C W Law Margaret E. J Leckie R. A C Lundie D M McKerrell, H A Maher Robert Moncrieff, G I Rooney Joan E. Warren Eleanor T Winter Arlene G M Wiseman.

Royal College of Physicians of Edinburgh

The following officers have been elected for the coming year

President Dr W A Alexander vice-president Dr D J A Kerr; treasurer Dr J A Bruce secretary and registrar Dr J Halliday Croom; hon librarian, Dr D M Lyon; members of council Dr L S P Davidson Dr Kerr Dr D N Nicholson Dr R. M Murray Lyon Dr G G M Hamilton and Dr Thomas Anderson

Royal College of Nursing

On Feb 27 28 and 29 the college is holding a conference on the mental health services Further details may be had from the conference secretary of the college *Henrietta Place* London W 1

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[1] Directory of Fellowship Awards 1917–50 Rockefeller Foundation, 49 West 49th Street New York.

Royal College of Surgeons of England

At a meeting of the council on Jan 10, with Sir Cecil Wakeley, the president, in the chair, Mr Gilbert Causey, F R C S, who is at present lecturer in anatomy and supervisor of the museum at University College, London, was appointed as Sir William Collins professor of human and comparative anatomy at the college

The following were elected to the fellowship of the Faculty of of Anæsthetists

Dr S N Albert (Beyrough), Dr A F Alsop (Oxford) Dr G Cousineau (Montreal), Dr P Edwards (London), Dr A C Forrester (Glasgow), Dr A P Gorham (Bristol) Dr Norman James (Melbourne) and Dr J R Ritchie (New Zealand)

Diplomas were awarded, jointly with the Royal College of Physicians, to the following

D.A —Janie U Blacker Amal Kumar Bose, Margaret L M. Bridges, Margaret W Brown, I S Bruce, R W Buckley, Cicely I Butterworth, R G Cole, J G Cranmer, Patricia R Ford Elizabeth M. France I C A D P Graham, Edith H Grundy, Mary J Hartley, H B Houldsworth J S Inkster Marcel Junod P D Kelsall, Pierre Koenig, C J Levy Pauline McArthur, Jan Mamak, W K Pallister, Edith J L Pearce, D J Power, J E Riding, R J Rutherford, Ajit Kumar Sen Gupta, Frances Sorrell Heather Stockdale, J C Sumption, Gian Chand Tandan Mirja Tappura, Hildegard H. M. Weisz, Margaret M. Whitaker, P B Wolfers

D I H —H D Conway J J du Plessis

D.L O —Krishna Deo Narayan Agrawal, Abdul Aziz, R H Cowling, Than Dok, Harold Forer, J D Glanville, Beatrice A J Gregory, D F N Harrison, W A Hopkins, H M. Jones, Zafar Ahmad Khan, P J McNicholas, D V Maytham, J R Page, Akkinepalli Badri Narayan Rao Mohamed Sheriff Mohamed Refai, John Vella, A L Wells G T Woods

D P M —C E Bagg John Cowie, E T Downham, R E Glennie, Mei-Chen Liu, B M Mandelbrote, R H Martlew, Marion E F Woollaston

D M R D —Amiya Kumar Banerji, Said Mahfuth Bingurnah, V H Bowles, James Brown Thomas Crisp, Harold Ferguson, A M. H Fisher, H L Francis, K D Hatfield H W Holland D T Irwin, Hal Jacobs, J B Jameson Sheila Kenny, N A Lewtas, Goloka Behari Mohanty, Prabhat Kumar Mookherjee, J J Q Peiris Krishna Mahadevan Pillai, Patrick Purcell, Margaret P Sheridan, G P G Sim, A G G Toomey, Duncan Urquhart, G H Waddington D R Wallace Jones, J M. Winn

D M.R.T —Diana M Brinkley, G E Catton, J H O Chance, P M. C Corlette T J Deeley, F M Hall Percy Haslam, G. A Hendry George Jarratt, Gerard Lynch, Dorothy Pearson

D T M.&H —Abdul Fattah Abdul-Kadir, M. E Barry A. B Dick, C E Hartley, Hla Tin, J H. McLaughlin, Roy Nevendra Nauth-Misir, A. B Paltrinieri, F J Wickremasinghe

D O M S —D K de B Macdonald

D O —K. D N Agrawal

D.P —C A K. Bird Nand Lal Modi

University of British Columbia

Dr Donald Paterson has been appointed clinical professor of pædiatrics in this university Dr Paterson was formerly physician to the Hospital for Sick Children, Great Ormond Street, London

Medical Artists' Association of Great Britain

The association has appointed as examiners for 1952 Sir Lancelot Barrington Ward, F R C.S, Prof W E Le Gros Clark, F.R C.S, F.R.S, Miss Audrey J Arnott, A R.C.A, and Miss Helen Wilson Drawings should reach the chairman of the board of examiners, c/o Dr Tompsett, Royal College of Surgeons, Lincoln's Inn Fields, London, W C 2, not later than Feb 28 Application forms may be had from Miss Mary Hawker, Snowdrop Cottage, Slut's Lane, Lindfield, near Haywards Heath, Sussex

Tuberculosis Educational Institute

Intensive three day clinical courses for doctors will be held at the following centres during 1952 Cheshire Joint Sanatorium, Market Drayton, Shropshire (March 19, 20, 21, May 14, 15, 16, Nov 12, 13, 14), King George V Hospital for Diseases of the Chest, Godalming, Surrey (Feb 27, 28, 29, June 4, 5, 6, Oct 1, 2, 3), Red Cross Sanatoria of Scotland, Tor na Dee and Glen o' Dee, Aberdeenshire (March 19, 20, 21, May 21, 22, 23, Oct 15, 16, 17) Further information may be had from the secretary of the Institute, Tavistock House North, Tavistock Square, London, W C 1

French Exchange Scholarships

Under a reciprocal arrangement with the Centre National de la Recherche Scientifique, the Medical Research Council invite applications from British workers in medical science, excluding clinical medicine, for two scholarships tenable at research institutions in France during 1952–53 The stipend of the scholarships will be 45,000–90,000 francs a month, according to qualifications and experience, and married men will receive a supplementary allowance Forms of application may be had from the secretary of the Council, 38, Old Queen Street, London, S W 1, with whom applications must be lodged by March 31, 1952

Scottish Health Services Council

Dr P K McCowan, physician superintendent of Crichton Royal, Dumfries, has been appointed a member of the Scottish Health Services Council Prof Dugald Baird, F.R C.O.G, Dr W G Clark, Dr Mary Esslemont, Dr A. F Wilkie Millar, and Sir Sydney Smith, M.D, have been reappointed to the council

British Schools Exploring Society

This society invites applications for the posts of hon. physician and hon. surgeon for the Central Iceland expedition, leaving about July 28 and returning about Sept 16 The cost to each member will be £120 plus about £2 10s for personal equipment Applicants should communicate as soon as possible with the society's secretary, c/o Royal Empire Society, Northumberland Avenue, London, W C 2

Award to Laboratory Technician

The New Year Honours list included the name of Mr L. W. Collison, senior technical assistant in the physiological laboratory of the National Institute for Medical Research, London, who received the M B E A correspondent suggests that this award "is a sign of the increasing awareness of the part played by the laboratory technician in medical research."

Mr Collison started his career as a boy of 14 in the Burroughs Wellcome Laboratories under Sir Henry Dale He followed Sir Henry to the National Institute for Medical Research in 1920 He has helped in designing and building apparatus for research A special electrode has been described under his name and, in collaboration with Prof A N Richards he has published a description of apparatus for measuring the oxygen consumption of small animals

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EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1188 The proportion admitted was 83 16%

Births, Marriages, and Deaths

BIRTHS

COX.—On Jan 9, in London, the wife of Mr Robert Cox, F R C.S —a son.

FRAZER —On Jan. 3 in Birmingham, the wife of Prof Alastair Frazer, M D —a daughter

HARDING —On Jan 7, the wife of Dr W G Harding—a son

HARRISON —On Jan 10, at Cambridge, the wife of Mr G Kent Harrison F R.C.S —a daughter

HART —On Jan 9 in London, the wife of Dr R D C Hart—a son

HART —On Jan 2 at Kaduna, Nigeria, the wife of Capt R J C Hart R.A.M C —a son

HUGHES.—On Jan 5, the wife of Dr J P W Hughes—a daughter

KATZ.—On Jan. 8, in London, to Dr Wendy Greengross, the wife of Mr Alexander Katz F R C S —a son

MARKBY —On Jan 11, at Wimborne, the wife of Dr E H Markby —a son

METCALF —On Jan 10, at Cheam, the wife of Dr James Metcalf —a son

OLIVER.—On Jan 7, in Edinburgh, the wife of Dr Michael Oliver, —a son

REID —On Jan. 7, the wife of Dr R O D Reid, of Henley—a daughter

SALVESEN —On Dec 27, at Dingwall, the wife of Dr. T M. N Salvesen—a son

WATTS —On Jan 6, at Balham, the wife of Dr Peter Watts—a son

WILSON —On Jan 5, the wife of Surgeon Lieutenant Ian Wilson, R N —a daughter

MARRIAGES

DASTUR—RIDPATH.—On Jan. 8, at Southampton, Howard Dastur F R.C.S to Kathleen Ridpath

MCKENDRICK—MILNER.—On Jan 5, at Helensburgh, William H. McKendrick M R C.S, to Jessie Antoinette Milner

MATHESON—RAISTRICK.—On Jan 10 in London William James Matheson M R.C P, to Audrey Raistrick

DEATHS

CHODAK GREGORY —On Jan 12, in London Hazel Haward Chodak Gregory, M D Lond, F R C.P (née Cuthbert)

COLBATCH CLARK.—On Jan. 5, at Wellington, Hereford, Henry Colbatch Clark, M R.C S

DICKENSON —On Jan 6, at Newshott, Haslemere, George Oswald Morrell Dickenson, M.B Durh surgeon captain, R N

DOBSON —On Jan 9, at Ilkley, Maurice Rowland Dobson O B.E. M B Lond, aged 74

DODSON —On Jan. 2, Eleanor Dodson, L.S A. Lond., formerly of Multan, India

EDWARDS —On Jan 13, Francis Henry Edwards, M D Lond, M.R.C.P, of Reigate, aged 80

MADDOCK.—On Jan 9, Edward Cecil Gordon Maddock, C.I.E., M D Edin., F R.C.S.E, lieut -colonel, I.M.S retd

MYLREA —On Jan 3, at the American Mission, Kuwait, Persian Gulf Charles Stanley Garland Mylrea, O.B E, Kaisar i Hind Gold Medal, M D Philadelphia, aged 75

PEAKE —On Jan 4, at Horsham, Sussex, William Pemberton Peake T D, M.R C.S

ACUTE INFECTIONS OF THE FINGERS AND HAND

DAVID BAILEY
M.B. Camb   F.R.C.S
ASSISTANT, SURGICAL UNIT UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, LONDON

ACUTE infections of the fingers and hand, although with the advent of antibiotics no longer a menace to life and limb still cause much disability and impose an economic burden on the community which can and should, be reduced.

Shortening of the period of disability can be achieved by the use of modern methods of treatment and by education of the public to seek advice early Delay in seeking treatment is commonplace and there is evidence that treatment in many places is still casual and inadequate Discredited methods of treatment are still widely used and lead not only to prolongation of disability but sometimes also to crippling and deformity which could have been avoided In recent years many workers have described and deplored the ill effects of wrongly timed and badly placed incisions (Harrison et al 1949 Gordon 1951) yet such incisions continue to be described in the standard textbooks of surgery to which the newly qualified doctor so often turns for guidance when first having to treat hand infections on his own responsibility

For these reasons a further report on the work of the hand clinic at University College Hospital is presented, comprising a recapitulation of the methods of treatment previously published (Pilcher et al 1948) and further evidence of their efficacy measured in terms of duration of disability and absence of crippling sequelæ

It has been the aim of those working on this project to devise and perfect methods of treatment which will not only give results in a special clinic but also can be used by the general practitioner works doctor or junior casualty officer working single-handed if need be There is no reason why the results obtained in a special clinic should be " a goal rather than a standard for the country as a whole " (Lowdon 1951) One of the factors in obtaining good results is, as will be shown, that treatment should be started as early as possible and in the ordinary course of events it is the general practitioner or the works doctor who has the best chance of seeing infected fingers early and of instituting the appropriate treatment. It is not claimed that superior results may not be obtained by more elaborate methods (London et al. 1948) but in the absence of very special facilities such methods are not often practicable and are certainly out of the reach of the general practitioner

CLINICAL MATERIAL

The present report is based on those cases attending the clinic for the first time between Jan 1 1949 and April 30 1951 During that time 2023 new patients attended Of these, 278 have been excluded because they were not cases of acute infection thus leaving 1745 for presentation These 1745 cases have been classified as follows

Acute paronychia	568 (32 5 %)
Chronic paronychia	63 (3 5 %)
Pulp abscess	270 (15 5 %)
Apical abscess	138 (8 0%)
Web abscess	47 (2 6%)
Cellulitis	141 (8·0%)
Subcuticular abscess	94 (5 4%)
Intracutaneous abscess	41 (2 6%)
Subcutaneous abscess	258 (14 8%)
Carbuncle	80 (4 5%)
Erysipeloid	16 (1 0%)
Miscellaneous	29 (1 6%)

Not all these cases are available for detailed analysis. The miscellaneous group includes cases of suppurative tenosynovitis and arthritis The total number of these conditions seen during the period under review is too small to make their presentation worth while so the results of their treatment have been omitted here An account of the treatment of arthritis has already been published (Riddell 1950) In the other groups only those cases which have been followed up to the time of their " official " discharge have been included Several other patients have taken their own discharge before healing has been quite complete so although the evidence suggests that almost all these cases were progressing satisfactorily they have been excluded It should be noted that cases are included whose treatment has been started outside, although in many of these further operation has been necessary

The total number of cases left for presentation is 985

TERMINOLOGY

A few notes are necessary on the nomenclature used The first five types of lesion are classified according to their anatomical site in the hand, the remainder are classified on a pathological basis.

Paronychia—This group has been divided into two types, acute and chronic Cases are classified as chronic if a history of more than fourteen days is given or if on examination a fungus infection of the nail seems to be the underlying cause. In such cases a recrudescence of infection after a few months freedom is common and for this reason the results of treatment are unreliable they have therefore been omitted from the detailed analysis. The term paronychia does not necessarily imply the formation of localised pus. A few cases are included in this group in which the infection has been aborted by the use of antibiotics and pus formation has not taken place

The term *pulp abscess* is used to connote only a subcutaneous abscess of the pulp of the terminal segment of the fingers Other writers have included under this heading subcutaneous infections of the pulp spaces of the middle and proximal segments (London et al 1948) which are here included under the heading of *subcutaneous abscess* and make up the greater part of this latter group the smaller part consisting of subcutaneous abscesses of the hand and dorsal surfaces of the fingers

The *apical abscess* is classified separately from the pulp abscess. This distinction has been criticised on the grounds that the apical abscess is merely a special example of a pulp infection Apical abscess, however is a subcutaneous infection of the extreme tip of the terminal segment of the finger is situated distal to the phalanx or just dorsal to its tip and tends to point under the free edge of the nail The main pulp space is not involved. These two types of abscess have a very different natural history; the apical abscess runs a shorter course and is less liable to complications On these grounds it is felt that there is justification for retaining the distinction The pathological anatomy of these two lesions and others is shown in the accompanying figure

Web abscess is a subcutaneous abscess in the loose tissues of the interdigital clefts and usually points on the volar surface of the palm although it may track dorsally

Cellulitis includes only those cases of infection which resolved without abscess formation If the patient originally presented with a diffuse cellulitis and subsequently a localised abscess formed the case has been included under one of the other headings The only exception to this rule is paronychia, which group as already explained, includes a few cases of diffuse infection which have been aborted by the use of antibiotics.

Erysipeloid is a diffuse infection due to a specific organism, *Erysipelothrix rhusiopathiæ* (of Rosenbach), and has been separated from other cases of cellulitis This type of infection is comparatively uncommon but not so rare as seems to be generally believed It occurs chiefly in butchers, fishmongers, and housewives (Goodwin 1950) It may be distinguished from cellulitis by its comparatively mild symptoms (itching and swelling are often the only complaints), by the peculiar purplish red discoloration of the skin, and by the precise demarcation of the inflamed area

METHODS OF TREATMENT

The methods of treatment used in the clinic have changed very little since 1948 The underlying principles are

1 Rest during the diffuse stage of the infection
2 No surgery until pus has formed
3 Control of infection by antibiotics
4 Drainage of abscesses by small incisions sited to preserve function

Rest

Many cases when first seen present abscesses which are ripe for incision, but others present without signs of localisation In all but the most mild of the latter type rest is imposed with a plaster-of-paris slab maintaining the fingers and hand in the position of function In addition the forearm is supported in a sling which elevates the hand as high as possible towards the opposite shoulder to control œdema This splinting is continued until the spreading stage is over, and may be continued for a few days after operation if incision becomes necessary Splinting and elevation are also used in cases of localised abscess if complicated by much œdema or by lymphatic spread Applications of dry heat (Gordon 1951, Lowden 1951) have not been found to be of any advantage and are not used

Antibiotics

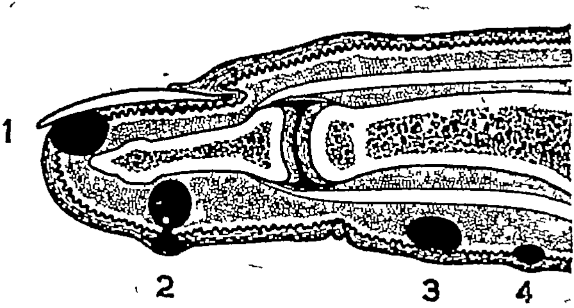
While the hand is rested as described above, the patient is treated with antibiotics to help to localise the infection At present penicillin is the only chemotherapeutic agent commonly used, and this is usually given as procaine penicillin 300,000 or 600,000 units once daily In some cases of severe infection, however, it has been thought wise to use crystalline penicillin 500,000 units six-hourly, in this case the patient is admitted to hospital. Routine cultures are not made in the clinic, but most of the infections seem to be due to *Staph aureus* (Harrison et al 1949) In view of the increasing incidence of penicillin-resistant strains of this organism, it may in future prove necessary to use the newer antibiotics It is proposed to undertake an investigation into the sensitivities of the infecting organisms, but in the present series penicillin was effective in controlling the spread of infection and aureomycin was used only in one or two isolated cases of infection with organisms known to be penicillin-resistant

Formerly penicillin was used to cover all the operations In the period now under review this rule has been relaxed Penicillin has been given either before or immediately after operation in most cases of pulp abscess, subcutaneous abscess, and web abscess, only being omitted in cases where the abscess has been small and well localised In paronychia, penicillin has only been used in about half the cases seen and tends now to be reserved for the more severe cases

In addition to its use systemically, penicillin is used locally as penicillin lactose powder (2000 units per g) This is applied as a light dusting after the evacuation of an abscess, particularly where bare bone has been felt in the floor of the cavity

Operation

Incision is not undertaken until there is evidence of a localised abscess In many cases the presence of this is made obvious by visible subcuticular (subepidermal) pus, in other cases the presence of a localised abscess is surmised from localised tenderness, and the site can always be accurately localised by testing for such tenderness with the closed points of a fine pair of forceps In some cases an additional indication is provided by a cyanotic tinge of the overlying skin



Types of digital abscesses: 1, apical abscess; 2, pulp abscess wit "collar-stud" extension; 3, subcutaneous abscess; 4, intracutaneou abscess.

We have continued to use local anæsthesia for operation in these cases, and, in spite of criticisms (Lowden 1951), have not met with any serious complications attributable to this method In 3 cases during the period under review the use of local anæsthesia has been followed by swelling of the finger close to the site of the ring block In 2 cases the swelling has been accompanied by vesiculation of the skin this appeared to be due to local sensitivity to procaine, a view which is substantiated by the fact that the complication was observed in one patient on two occasions when ring blocks were carried out at an interval of some weeks for lesions of different fingers The use of this type of anæsthesia is a matter of convenience, and general anæsthesia is as good, provided it is of adequate duration There are two advantages of local anæsthesia however it can be induced by the surgeon working single-handed, and it permits an unhurried operation In addition, patients who have had experience of both local and general anæsthesia for operation on septic fingers have almost invariably expressed a preference for the former The barbaric use of surface anæsthesia with ethyl chloride, and the "smash and grab" under unstable nitrous oxide anæsthesia, are mentioned only to be condemned.

The method in use in the hand clinic at University College Hospital is as follows For the fingers a rubber tourniquet is first applied to the base of the digit after elevation of the hand for a minute and a ring block is then performed using 1 ml. of 2% procaine (without adrenaline) for each digital nerve In the case of infections of the hand or bases of fingers, the median, ulnar, and radial nerves are blocked at the wrist, and to produce a bloodless field a sphygmomanometer cuff applied to the upper arm is used as a tourniquet Recently 2% 'Xylocaine' (with adrenaline) has been used for wrist block and the anæsthesia has been found superior to that produced with procaine, the only disadvantage being the length of time for which the hand remains without sensation, 2 ml for each nerve-trunk is satisfactory Xylocaine has not been used for digital nerve block, because procaine is entirely satisfactory

Before operation the affected part is cleaned carefully with cetrimide If pus is subcuticular (see figure) a deep extension is sought after removal of the raised epidermis, and, if found, is probed to determine its extent The sinus leading to the subcutaneous cavity seldom suffices for drainage It is enlarged by incision to permit inspection of the walls of the abscess, and the edges are cut away to form a small diamond shaped opening If this is not done, premature healing hinders subsequent drainage If no subcuticular pus is visible, the abscess is opened at the point where it is judged to be closest to the surface, the incision being made in the direction of Langer's lines The edges are cut back to promote and maintain drainage as described above. No drains of any sort are used, nor is the wound ever plugged with dressing When all pus and loose slough have been evacuated, the wound is lightly dusted with penicillin lactose powder and a dressing of dry gauze is applied

Aftercare

Patients who have been operated on are seen next day and the dressing is changed This has been found advisable because there is nearly always some venous oozing from the wall of the abscess cavity which stiffens the gauze dressing and destroys its absorptive power moreover *it causes little pain to remove the dressing after twenty four hours* whereas *if left for longer it may* become firmly stuck. Subsequent dressings are done at intervals of one to three days according to the needs of the case. It is important in using the technique of minimal incision to see the patients fairly often at first to ensure that drainage remains adequate. The patients are instructed not to allow the dressings to become wet and not to interfere with them in any way wet dressings have not, we consider any place in the treatment of infections of the hand The only exception to this rule of non interference by the patient is that, in the later stages of the postoperative treatment of acute paronychia it has been found advantageous to instruct the patients to remove the dressings daily, to wash the affected part with soap and water, using a soft nailbrush and after drying carefully to replace the dressing as a protection against gross contamination

Patients are not discharged from the clinic until the lesions are fully healed Our criteria of healing are complete epithelialisation without scabbing the absence of local swelling and the return of full function to the hand. If the final functional result is likely to be short of normal the patient is not discharged until further improvement is unlikely

SPECIAL APPLICATION OF PRINCIPLES OF TREATMENT

For some types of lesion an elaboration of these principles is necessary

In *acute paronychia* the infection is subcuticular and subcutaneous extension is rare Only very occasionally is a paronychia seen before pus has formed but, when it is seen within twenty four hours of the onset, it may be possible to abort the infection by the combination of rest and antibiotics. In most cases, however, pus is present on first attendance and the abscess is drained by stripping the nail fold away from the base of the nail. The pus is evacuated and any loose cuticle is cut away No incisions into subcutaneous tissue are made The base or lateral margin of the nail is only resected if there is pus lying deep to it. If the base of the nail is undermined, the whole width of the base is resected if only part of it is taken a sharp corner may be left which often causes a persistent granuloma to develop

Pulp Abscesses.—The hockey-stick and alligator ' incisions are not used The general principles are followed and when evidence of localisation is forthcoming the abscess is opened by a small incision placed directly over it wherever it may be It is important that incision should not be undertaken during the stage of diffuse cellulitis, and it is equally important not to delay incision for long when pus is localised In our clinic about 20% of pulp infections are first seen in the diffuse stage, which is contrary to the experience of some workers (Bolton et al. 1949)

Apical abscess is opened by resection of a V wedge of nail and adjoining epidermis drainage being secured by paring back the skin edges to form a diamond-shaped opening The abscess cavity commonly extends down to bone, but osteitis is a rare complication

Web infections are often seen for the first time before localisation has occurred and are accompanied by gross œdema of the dorsum of the hand This œdema is reduced by the method described and penicillin is given When it is particularly severe as it often may be it is advisable to put the patient to bed and to suspend the forearm from a nearby object a drip stand is convenient for hospital use. Once localisation has occurred, as shown by swelling in the web space and localised tenderness the abscess is opened through a transverse incision made either at the base of a digit or opposite the interdigital space according to where the abscess appears to be pointing Skin only must be incised initially or the digital nerves may be damaged The abscess cavity is probed and its extent determined, subcutaneous tissue is then incised to secure drainage and in a direction to avoid damage to the nerves which are pushed aside by the enlarging abscess The wound edges are pared back in the usual manner No drains or counter incisions are used. After incision inflammatory œdema of the hand rapidly subsides, but the splint is retained until it has done so

Carbuncles are common on the dorsal aspect of the proximal segment of the fingers and of the hand Splinting and chemotherapy are the mainstays of treatment and surgery is confined to the removal of overlying dead epidermis, which may be accomplished without pain. Slough is lifted out when it has separated. Incision of carbuncles and the excision of still adherent slough has not been found necessary and in fact if this is attempted spread of infection is likely to ensue.

In *erysipeloid* surgery was not required in any case in this series. The prompt response to penicillin is almost pathognomonic but it has been found advisable to continue it for at least two or three days after all signs of activity have disappeared or recurrence is likely

RESULTS OF TREATMENT

The results of treatment are shown in table I The total length of disability has been selected for presentation—i e the interval between the onset of the disease and the completion of treatment This interval is made up of two parts: (1) the interval between the onset of the disease and the patient's first attendance at the clinic, and (2) the interval occupied by treatment. Only cases for which complete records are available have been included The present series (January 1949–April 1951) is under the heading 1951 series and is compared with the series described by Pilcher et al. (1948) headed ' 1947 series ' and an intermediate series including those cases seen in the clinic between July, 1947 and December 1949—the 1949 series.

TABLE I—AVERAGE LENGTH OF DISABILITY IN VARIOUS TYPES OF INFECTIONS OF FINGERS AND HAND

Infection	Length of disability (days)		
	1951 series	1949 series	1947 series
Acute paronychia	11·3 (*299*)	13·6 (*194*)	14·7 (*76*)
Pulp abscess	18·7 (*168*)	22·5 (*97*)	23·7 (*71*)
Apical abscess	11·0 (*1*)	11·7 (*47*)	11·6 (*20*)
Web abscess	14·6 (*20*)	16·0 (*31*)	18·4 (*7*)
Cellulitis	9·0 (*66*)	8·1 (*44*)	14·8 (*32*)
Subcuticular abscess	7·3 (*3*)	10·8 (*45*)	9·1 (*24*)
Intracutaneous abscess	9·4 (*24*)	11·8 (*53*)	8·1 (*11*)
Subcutaneous abscess	14·5 (*127*)	17·7 (*10*)	10·5 (*65*)
Carbuncle	17·1 (*31*)	21·8 (*36*)	36·7 (*2[illegible]*)
Erysipeloid	23·1 (*11*)	18·8 (*14*)	12·9 (*7*)

Numerals in parentheses are numbers of cases.

TABLE II—DELAY IN PRESENTING FOR TREATMENT AND LENGTH OF TREATMENT

—	Acute paronychia		Pulp abscess		Sub cutaneous abscess		Carbuncle	
	Series 1951	1947	Series 1951	1947	Series 1951	1947	Series 1951	1947
From onset to attendance (days)	5 3	4 4	5 5	5 8	4 6	5 5	5 0	4 5
Length of treatment (days)	8 7	9 8	12 7	16 8	9 6	14 0	11 8	32 2
Length of disability (days)	14 3	14 7	18 7	23 7	14 5	19 5	17 1	36 7

DISCUSSION OF RESULTS

It will be seen that there has, in most types of lesion, been a progressive reduction in the average length of disability The outstanding exception is erysipeloid, the poor results for the 1951 series being mainly due to the inclusion of one case which required treatment for 34 days after a delay of weeks before first attending the clinic It will be noted also that the prognosis for apical abscess is very much better than for pulp abscess, another reason for separating the two types

It is instructive to separate the two components of the disability period, and in table II are presented the relevant data for acute paronychia, pulp abscess, subcutaneous abscess, and carbuncle The figures show a reduction in the length of treatment but not in the delay before attendance It has already been indicated that the methods of treatment used in the clinic have not been substantially changed since 1948 The improved results cannot therefore be ascribed to new methods, and it may be thought a fair assumption that they are due to the accumulated experience of the clinic over the past five years Perhaps it should here be mentioned that new methods have been investigated, but none of them has been brought into general use and the number of cases so treated has been small

Lowden (1951) has commented on the difficulties of persuading patients to attend early and on the adverse effects of delay in pulp infections To show the effects of delay we have divided the cases of the present series into two groups the *early cases* (attending within four days of the onset of the lesion) and the *late cases* (first attending more than four days after the onset) The results are presented in table III, from which it appears that delay is more harmful in some types of infection than in others In the cases of pulp abscess, subcutaneous abscess, carbuncle, and cellulitis the effects of delay are serious In some types of infection delay seems to be an advantage—e g, intracutaneous abscess—whereas in the case of web abscess it seems to matter very little one way or the other, but perhaps it should be mentioned that in this last group no example of very long delay was met with, the longest interval between onset and seeking advice being six days, this is presumably due to th alarming appearance and acute pain produced by th type of infection

It is realised that some of the numbers of cases shown in table III are too small to be statistically significant but, if a similar analysis is made of the earlier series a similar trend is noticed for each of the types of infection except acute paronychia For this group the figures fo the earlier series suggest that delay in seeking treatmen makes little difference, whereas the figures shown abov suggest that delay adversely affects the prognosis

TABLE III—LENGTH OF TREATMENT IN EARLY AND LATE CASES IN 1951 SERIES

Infection	Length of treatment (days)	
	Early cases	Late cases
Acute paronychia	8 4 (*163*)	9 8 (*136*)
Pulp abscess	10 2 (*71*)	18 0 (*91*)
Apical abscess	5 7 (*39*)	6·6 (*32*)
Web abscess	8 4 (*12*)	8 3 (*8*)
Cellulitis	5 5 (*45*)	8 5 (*10*)
Subcuticular abscess	4 0 (*26*)	3 7 (*6*)
Intracutaneous abscess	5 5 (*17*)	4 3 (*7*)
Subcutaneous abscess	9 1 (*73*)	11 2 (*54*)
Carbuncle	10 4 (*15*)	13 1 (*16*)
Erysipeloid	None seen	10 7 (*11*)

Numerals in parentheses are numbers of cases

COMPLICATIONS

One of the bad results of a long delay before treatmen is that in the late cases the incidence of complications i much higher

The prolongation of treatment when complication occur is shown by the example of pulp abscess.

Average length of treatment in uncomplicated cases	(143) =	7 4 day
Average length of treatment in complicated cases	(39) =	32 3 day

It has therefore been thought worth while to discuss briefly the most important complications which hav been met with in the larger groups

In *acute paronychia* in this series the incidence o complications was 11 9% In 17 cases the first operatio which had been done was inadequate (in all but 7 case this first operation had been done before the patien attended the clinic) In 5 cases there was extension t the pulp space (in retrospect it seems more probabl that these were cases of lateral pulp abscesses whic had pointed alongside the nail (Pilcher 1951), but sinc the cases were in the original notes described as example of acute paronychia they have been left in that group) In all these 5 cases the extension was noted at th patient's first visit 6 cases were complicated by non coöperation from the patients—either interference wit the dressings at home or irregular attendance 2 case (both very late) were complicated by extension o cellulitis from the affected finger to the hand Th remaining complications were single examples, such a severe lymphangitis, persistent axillary lymphadenitis and osteitis of the terminal phalanx The last name was the only example of bone infection met with in 35 cases of acute paronychia

Pulp abscesses carry a high rate of complications In this series it was 21 4% No less than 21 cases were complicated by bone infection 9 of these were examples of osteomyelitis with subsequent sequestrum formation, the remainder were cases of osteitis or periostitis without major sequestrum formation in which radiography demonstrated rarefaction of the terminal phalanx with perhaps sequestration of minute fragments of the cortex In all except 7 of these 21 cases the complication was recognised at operation on the patient's first attendance at the clinic and subsequently confirmed by radiography. All were very late cases In only 1 case did osteomyelitis develop when there were no signs of bone infection at the first attendance—and this in a psychopath who refused penicillin and attended only at very irregular intervals In 9 cases the first operation which had been performed was inadequate or inappropriate, in all save 2 the operation had been done elsewhere, and in most of these operations the incisions were of the classical hockey stick or alligator variety In 4 cases the abscess cavity was filled with unusually adherent slough which took a long time to separate, the clinical impression is gained that treatment with antibiotics predisposes to this complication The other 5 cases are single examples and not important

Apical Abscess —In support of our plea for the recognition of this type of abscess as a separate entity, it is interesting to consider its complications and to contrast them with those described for pulp abscess. The incidence of complications in the group of apical abscess was only 6·25% In only 3 cases was bone infection met with and in none of these did major sequestration take place. All 3 were noted at the time of the patient s first attendance In 1 case the first operation was inadequate to provide drainage and in 1 case the patient's finger became stiff probably owing to œdema, and a long course of mobilisation was necessary

Subcutaneous Abscess —In this group the complication rate was 14·4% In no case was this type of lesion complicated by bone infection In 3 cases the first operation was inadequate and had to be repeated (only 1 of these was done in the clinic) In 3 cases the complication of delayed separation of slough was met with this has already been discussed under pulp abscess In 5 cases there was residual stiffness of the finger probably due to failure to reduce œdema by splinting and elevation In 1 case a premature incision had been made during the stage of cellulitis Nine other complications were met with singly and none was important apart from involvement of a tendon sheath (without fully developed tenosynovitis) in 1 case and involvement of an interphalangeal joint in another

There is no particular interest in the complications met with in the other groups and it is not proposed to enumerate them It is however perhaps worth noting that no complication was met with in the treatment of *web abscesses* in this series, and between January, 1946 and April, 1951 69 cases of this condition have been followed to complete healing without any complication

Finally in this series we have not encountered any example of a persistently tender scar in the cases which have been operated on in the clinic

SUMMARY

A second report is presented of the methods and results of treatment in a special clinic for infections of the fingers and hand.

The principles of treatment are rest in the diffuse stage of infection control of infection with antibiotics and drainage of abscesses through small incisions

Since the first report (Pilcher et al 1948) the duration of treatment has been reduced but delay in seeking treatment has not. In most categories delay in seeking treatment increases the length of treatment Also complications are more common when treatment is delayed

Pulp abscess and subcutaneous abscess have the highest incidence of complications

Bone infection is the important complication of pulp abscess. Its incidence is clearly correlated with delay in starting treatment

Apical abscess is differentiated from pulp abscess because of its better prognosis

The hand clinic whose work I have reported is staffed by a team with frequent changes in membership The following have worked in the clinic during the period covered by this report: Miss E. E. Davies, Messrs. J F Bolton Carter A. R. C Butson K. Chitty B B Milstein N C Newton, D. H. Phillips and A G Riddell With them any credit for this work must be shared *The clinic is under the direction* of Prof R S Pilcher to whom I am grateful for help and advice in the preparation of the report

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FACTORS INFLUENCING THE RATE OF HEALING OF GASTRIC ULCERS

ADMISSION TO HOSPITAL PHENOBARBITONE AND ASCORBIC ACID

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DESPITE the extensive literature on the therapy of peptic ulcer there is little detailed knowledge of the factors which influence the rate of healing of the ulcer crater In their textbook on peptic ulcer Ivy et al (1950) say: ' There is no evidence showing that the strict Sippy regimen or the continuous intragastric drip is superior to less rigid regimens given under either hospitalization or ambulation in so far as the rate of filling in of the ulcer crater is concerned. Gill (1947) has even cast doubt on the value of any form of régime other than that necessary to gain the patient s confidence With 1 exception he found that 20 patients with chronic gastric ulcers treated only with daily injections of distilled water lost their pains as quickly as did a control series treated on orthodox lines Moreover, healing of the ulcers which was observed gastroscopically took place in the usual time

For these reasons we thought that a formal investigation into the factors influencing the rate of healing of peptic ulcers might be of therapeutic interest and might also provide a clue to ætiology Gastric and duodenal ulcers are believed to have different causes and they must therefore be studied separately Since it is harder to assess the healing of duodenal ulcers the investigation was confined to patients with gastric ulcers.

In view of Gill s (1947) observations the first object was to assess the value of hospital treatment It was hardly practicable to insist that patients many of whom were pain free should stay off work and in bed at home for several weeks nor was it practicable to ensure that a very restricted *diet* was not exceeded when the patient was not under regular observation We accordingly *decided to compare the effects of a standard* dietetic régime in bed in hospital with the effects of a *convalescent diet taken when up and about at home* The use of a suitable experimental design made it *possible to assess the effects of two subsidiary drug* treatments at the same time and phenobarbitone and ascorbic acid were chosen for inclusion in the initial trial

METHOD

All new outpatients with uncomplicated and radiographically proven gastric ulcers were referred for consultation and arrangements were made for their admission

Some patients who had had ulcers diagnosed previously were also included in the early stages of the investigation paucity of beds made it necessary to cut down the number of entrants and the trial was later limited to patients whose ulcers were diagnosed for the first time

Many patients were pain free by the time of the consultation and were therefore not prepared to come into hospital. Those admitted were treated in a standard way for a week during which the barium meal was repeated and gastroscopy was performed At the end of the week the patient s clinical condition was assessed Those in whom a benign gastric ulcer had not been confirmed in *hospital by both radiography and gastroscopy* and those whose clinical condition required some specific treatment—e g , operation—were excluded from the trial The method of treatment of the remainder was then determined by opening one of a series of sealed envelopes which had been prepared independently by a colleague and which contained, in a random order, instructions to treat the patient by one or other of the prearranged methods

Patients in series A were treated in bed in hospital for four weeks , for the first two weeks they were given a moderately strict orthodox diet (stage 2) and for the last two weeks a more liberal one (stage 3) They were then re examined radiographically, discharged, recommended to continue on a "convalescent" diet and advised to return to work as soon as they felt fit enough The diets used were those recommended by Avery Jones (1949). Patients in series B were discharged immediately and were treated from the outset in the way series A patients were treated after their month's stay in hospital

Within both series the patients were divided into subgroups of four, each member of which was allocated at random one of four drug régimes

(1) ascorbic acid 50 mg t d.s and phenobarbitone gr ¼ t d s ,

(2) ascorbic acid 50 mg t d.s and an inert tablet t d.s.,

TABLE I—CASE SUMMARIES, TREATMENT, AND RESULTS

Case no	Sex	Age (yr)	History		Size of ulcer niche (sq mm.)					Symptoms (for scale see text)		
			Length of history	Previous hospital treatment	At start of treatment	1 month later		3 months later		At start of treatment	1 month later	3 months later
						Size	% change	Size	% change			
Treatment inpatient, phenobarbitone and ascorbic acid												
1	F	40	5 yr	−	87	31	−64	13	−85	+	1	0
23	M	38	6 mos	−	34	34	0	483	+1321	+	2	2
39	M	55	2½ yr	−	53	15	−72	5	−91	+	2	1
59	M	26	18 mos	−	105	107	+2	63	−40	−	2	1
77	M	63	4 mos	−	152	63	−59	13	−91	+	1	0
96	M	55	20 yr	−	16	6	−63	28	+75	−	0	0
116	M	58	2 yr	−	52	47	−10	84	+62	+	1	2
122	M	25	1 yr	−	13	6	−54	0	−100	−	0	1
Treatment inpatient and phenobarbitone, no ascorbic acid												
15	M	40	3 mos	−	110	21	−82	24	−80	+	1	1
48	F	72	3 yr	−	30	0	−100	0	−100	+	1	0
69	M	53	10 yr	+	18	6	−67	37	+106	+	1	2
72	F	63	38 yr	−	13	4	−69	0	−100	+	1	1
91	M	67	10 yr	−	26	0	−100	0	−100	−	0	0
110	M	68	6 mos	−	90	30	−67	0	−100	+	0	0
132	M	53	4 mos	−	214	59	−72	14	−93	+	2	1
138	M	27	18 mos	−	10	8	−20	0	−100	−	0	0
Treatment inpatient and ascorbic acid , no phenobarbitone												
7	F	39	4 yr	+	23	4	−83	5	−78	+	1	2
21	F	45	17 yr	−	7	11	+57	9	+29	+	1	2
54	M	54	15 yr	−	170	28	−84	0	−100	+	2	0
62	M	46	10 yr	+	89	38	−57	59	−34	+	2	2
89	F	57	6 wk	−	92	26	−72	0	−100	+	0	0
94	M	46	14 yr	−	51	0	−100	5	−90	−	0	1
109	M	59	11 mos	−	15	0	−100	37	+147	+	0	2
121	F	58	3 wk	−	137	22	−84	0	−100	+	0	2
Treatment inpatient no phenobarbitone or ascorbic acid												
10	M	54	6 yr	+	22	25	+14	22	0	−	0	1
30	M	71	18 mos	+	276	31	−89	40	−83	+	1	1
37	M	50	18 yr	+	34	0	−100	0	−100	+	0	0
53	M	60	25 yr	+	275	222	−19	23	−92	+	2	2
80	M	66	10 yr	+	140	81	−42	26	−81	+	2	1
103	F	60	15 yr	+	27	4	−85	0	−100	+	0	0
105	M	66	18 yr	−	17	2	−88	0	−100	−	0	0
154	M	53	20 yr	−	89	39	−56	48	−46	+	2	2
Treatment outpatient phenobarbitone, and ascorbic acid												
29	M	37	4 yr	+	154	70	−55	63	−59	+	2	2
36	F	68	7 mos	−	347	192	−45	75	−78	+	2	2
55	F	52	2 yr	−	20	26	+30	31	+55	+	1	1
84	F	35	6 yr	−	41	14	−66	29	−29	+	1	2
99	M	51	2 mos	−	57	21	−63	15	−74	−	1	1
107	M	52	6 wk	−	161	161	0	396	+146	+	2	2
123	M	46	18 mos	+	15	0	−100	26	+73	+	2	2
134	M	42	3 yr	−	28	13	−54	0	−100	−	1	0
Treatment outpatient and phenobarbitone , no ascorbic acid												
12	F	47	1 yr	−	37	23	−38	4	−89	+	1	2
19	M	51	12 yr	+	16	12	−25	28	+75	+	1	1
40	M	64	5 yr	−	2	0	−100	0	−100	+	1	0
68	M	52	7 yr	−	17	20	+18	10	−41	+	2	2
70	M	37	7 yr	+	8	10	+25	10	+25	+	1	1
97	M	38	4 mos	−	14	14	0	4	−71	−	1	1
108	M	51	7 wk.	−	20	3	−85	5	−75	−	2	2
129	M	44	10 yr	−	89	27	−70	6	−93	+	2	2
Treatment outpatient and ascorbic acid , no phenobarbitone												
3	M	64	4 yr	+	9	37	+311	103	+1044	+	2	2
27	M	47	7 yr	+	68	67	−1	93	+37	−	0	1
34	F	63	5 yr	+	20	27	+35	64	+220	+	2	3
56	F	45	12 yr	+	10	8	−20	7	−30	−	2	3
88	M	60	4 mos	−	15	3	−80	0	−100	+	0	0
102	F	72	2 yr	−	5	0	−100	0	−100	+	1	1
125	F	49	19 mos	−	19	21	+11	32	+68	+	1	3
142	F	63	7 yr	−	20	56	+180	49	+145	+	2	2
Treatment outpatient no phenobarbitone or ascorbic acid												
16	M	52	28 yr	+	54	72	+33	46	−15	+	1	1
20	M	52	20 yr	−	15	13	−13	3	−80	−	0	0
38	F	61	10 mos	−	25	10	−60	7	−72	−	0	0
71	M	43	19 mos	−	16	1	−94	0	−100	+	1	0
76	M	43	20 yr	+	90	81	−10	67	−26	+	2	1
92	M	53	29 yr	−	10	9	−10	8	−20	+	0	0
120	M	33	6 yr	−	15	19	+27	18	+20	−	1	2
153	F	76	4 mos	−	95	41	−57	32	−66	+	0	0

TABLE II—COMPARISON BETWEEN PATIENTS IN EACH TREATMENT GROUP BEFORE TREATMENT WAS STARTED

Characteristics of patients before treatment	No of patients in each group					
	Main treatment		Phenobarbitone		Ascorbic acid	
	A	B	+	−	+	−
Sex						
M	24	21	25	20	19	26
F	8	11	7	12	13	6
Age:						
Under 35 yr	3	1	3	1	2	2
35 –	4	8	9	3	6	6
45 –	9	14	10	13	11	12
55 –	9	6	6	9	11	4
65 +	7	3	4	6	2	8
Length of history:						
Under 1 yr	8	8	10	6	9	7
1 –	8	9	11	6	12	5
5 –	7	11	9	9	8	10
15 +	9	4	2	11	3	10
Previous hospital treatment						
Yes	9	10	5	14	8	11
No	23	22	27	18	24	21
Presence of symptoms on admission						
Yes	24	23	23	24	24	23
No	8	9	9	8	8	9
Size of ulcer crater						
Under 15 sq mm.	4	7	6	5	5	6
15 –	11	16	13	14	12	15
50 –	8	6	6	8	8	6
100 +	9	3	7	5	7	5

(3) an inert tablet t.d.s and phenobarbitone gr $^{1}/_{4}$ t.d.s.;
(4) two inert tablets t.d.s

The drugs were, in each case given daily for three months.

Alkaline powders (1 drachm of equal quantities of calcium and magnesium tribasic phosphate) were given to patients in both series, to be taken at the patient's discretion as necessary for the relief of pain

All the patients were kept under observation for three months patients in series B were seen twice in the first month but otherwise all outpatients were seen monthly unless their clinical condition required more frequent supervision Barium examinations were repeated four weeks, eight weeks, and twelve weeks after the initial inpatient barium meal As far as possible the radiographic examinations were made by the same radiologist and the radiographs were taken in such a way as to show as large as possible the niche produced by the ulcer

Progress was assessed subjectively by the patient's description of his symptoms and objectively by measuring the size of the niche The subjective assessment was recorded on a three point scale according to the severity of the symptoms during the period of observation: 0, pain free 1, occasional pain or minor dyspeptic symptoms 2, daily pain for as long as a week Symptoms during the initial week of investigation before the start of specific treatment, were ignored. The size of the niche was measured by outlining it in pencil on the radiograph, covering the radiograph with transparent graph paper and counting under a magnifying glass the number of squares 1 mm in diameter included within the pencilled outline. Ulcers were considered to be healed when the radiologist reported that no niche was detectable the finding of convergent folds, or an irregularity in the gastric outline, without a niche, was taken to indicate scarring It is realised that gastroscopy would have shown incomplete epithelisation in many so-called healed cases, but repeated gastroscopies were not considered justifiable, and since the same criteria were used uniformly throughout the investigation the inaccuracy was not material The extent of healing in a given period was determined by expressing the reduction in size of the niche as a percentage of its initial size

TABLE III—RELATION BETWEEN PROGNOSIS AND CERTAIN SELECTED CHARACTERISTICS OF PATIENTS

Rank correlation between % reduction in size of ulcer crater and	S/S E.(S)	Probability of getting as high a value of S purely by chance
Sex	0.37	$0.70 < P < 0.80$
Age	1.31	$0.10 < P < 0.20$
Length of history	1.47	$0.10 < P < 0.20$
Previous hospital diagnosis	1.21	$0.20 < P < 0.30$
Presence of symptoms on admission	0.17	$0.80 < P < 0.90$
Size of ulcer crater before treatment	0.21	$0.80 < P < 0.90$

With this form of experimental design it is possible to assess the effects of three forms of treatment on the same group of patients. The results obtained in series A can be compared directly with the results obtained in series B for both series are comparable in that a quarter of the patients in each received phenobarbitone a quarter received ascorbic acid, a quarter received both and a quarter received neither Similarly the patients who received phenobarbitone can be compared with those who did not and the patients who received ascorbic acid can be compared with those who did not

RESULTS

The number of patients included in the investigation was 64 Details of the cases methods of treatment, and results are shown in *table I*

The investigation was not planned to ensure that any one type of ulcer was equally represented in all the treatment groups because it was not known with certainty that any specific type healed more or less rapidly than any other Consequently it is necessary to determine what differences there were between the patients in each group before treatment was begun and to test whether the differences could produce different rates of healing for the different groups The constitution of each of the treatment groups as regards sex age length of history hospital treatment before the investigation presence of symptoms on admission and initial size of the ulcer niche is shown in table II

From table II it is clear that there were some differences between the groups and this was to be expected in view of the random method of allocation of treatments. More patients in series A than in series B were aged 55 or over and more had moderate or large ulcers—i e craters with measured cross sections of more than 50 sq mm More of the patients who received phenobarbitone than of those who did not were men more gave a history of less than five years, and less had had any previous hospital treatment Less of the patients who received ascorbic acid than of those who did not were men and more gave a history of symptoms for less than five years.

TABLE IV—RESULTS OF TREATMENT ASSESSED BY CHANGES IN SIZE OF ULCER CRATER (COMPARISON BETWEEN PATIENTS IN SERIES A AND B)

Treatment group	No of cases with crater			
	Healed	$^{1}/_{2}$ or more healed	Less than $^{1}/_{2}$ healed	Larger
	One month after start of treatment			
A	5	13	11	3
B	3	4	16	9
	Three months after start of treatment			
A	12	10	4	6
B	5	8	8	11

TABLE V—RESULTS OF TREATMENT ASSESSED SUBJECTIVELY BY PATIENTS' SYMPTOMS (COMPARISON BETWEEN PATIENTS IN SERIES A AND B)

Treatment group	No of cases with symptoms (for scale see text)		
	0	1	2
		First month	
A	13	10	9
B	6	14	12
		Second and third months	
A	13	9	10
B	8	9	15

The effect of each of the characteristics considered can be tested separately by the method of rank correlation (Kendall 1948) For example, if the results for each patient are listed in order according to the extent of healing secured in a month, it can be determined whether there is any tendency for the results in patients of one sex to be aggregated towards one end of the list, or whether the male and female cases are evenly distributed throughout Since eight different combinations of treatment were used (inpatient, phenobarbitone and ascorbic acid, inpatient, phenobarbitone but no ascorbic acid, &c) it might have been necessary to test the effect of each characteristic within each treatment sub group separately and to sum the results It will, however, be shown that the giving of phenobarbitone and ascorbic acid made little or no difference, hence these treatments can be ignored. Correlations were therefore calculated independently only for patients in series A and B The results are set out in table III

It is not justifiable to conclude from table III that the characteristics considered are completely unrelated to the rate of healing of gastric ulcers in general The series is small, and a larger series might well reveal a significant correlation between, for example, the rate of healing and the length of history It is, however, reasonable to conclude that the differences noted between the patients in the different treatment groups are unlikely to have materially affected the results, and the groups may be considered comparable from the point of view of assessing the effects of the different treatments

TABLE VI—EFFECTS OF TREATMENT ON SUBSEQUENT HEALING OF ULCERS (COMPARISON BETWEEN PATIENTS IN SERIES A AND B)

Treatment in first month	Change in size of ulcer crater in second and third months No of cases with crater			
	Healed	²/₃ or more healed	Less than ²/₃ healed	Larger
A	9	5	4	9
B	3	4	13	9

1 Patients whose ulcers were completely healed after one month s treatment are excluded from the table

2 The number of ulcers which healed completely in the second and third months (12) is not equal to the difference between the numbers which were healed at the end of the third and of the first months respectively, shown in table IV—i e 17–8—because 3 of the ulcers which were healed after a month broke down again in the next two months

Hospital Treatment

Table IV shows the extent of healing achieved by patients in series A and B after one month's and three months' treatment Table V shows the patients' subjective assessment of their symptoms Both tables IV and V indicate that patients in series A did better than patients in series B If the numbers of patients in the two series who showed more and less than two-thirds healing are compared, the differences are statistically significant both one and three months after the beginning of treatment (one month, $X^2=7\ 94$, $n=1$, $P<0\ 01$, three months $X^2=5\ 11$, $n=1$, $0\ 02<P<0\ 05$) The division at two-thirds healing is admittedly somewhat arbitrary, and it may be suggested that, if some other dividing line had been chosen, the differences might not appear so definit The procedure is, however, justified by the resul obtained by the more detailed statistical test of ran correlation, which has been referred to above This tes which does not depend on any arbitrary groupin confirms that there is a significant difference betwe the results obtained in the two series—a marked o after one month (S/S E (S)=2 78, $P<0\ 01$) and a le marked one after three months (S/S E (S)=2 52, $0\ 01<$ $<0\ 02$) On the other hand, the figures in table indicating the patients' subjective assessments of the symptoms, do not show a statistically significant differen between the series They do, however, suggest a tendenc in the same direction—i e, for better results to b obtained with inpatient treatment The failure demonstrate a significant difference may reasonably b attributed to the coarseness of the method of assessmen

TABLE VII—EXTENT OF HEALING IN SECOND AND THI MONTHS IN RELATION TO EXTENT OF HEALING IN FIR MONTH

Extent of healing in first month	Progress in second and third months No of cases showing		
	Complete healing	Partial or no healing	Deterioratio
²/₃ or more	9	3	5
Less than ²/₃	3	15	9
Deterioration	0	8	4

Patients whose ulcers were completely healed after one month excluded from the table

Patients in series A were discharged from hospit after a month's treatment and were treated as outpatien for two more months in the way patients in series B ha been treated from the outset The extent of healin achieved during the second and third months, in thos patients incompletely healed after a month, is shown table VI More patients in series A than in series achieved a further two thirds' healing in this perio ($X^2=4\ 58$, $n=1$, $0\ 02<P<0\ 05$) The rank correlatio test, however, does not confirm the statistical significanc of the difference (S/S E (S)=1 43, $0\ 10<P<0\ 20$), an the suggestion that a course of inpatient hospital treatment continues to exert a beneficial effect on the rate o healing of a gastric ulcer after the patient has bee discharged should therefore be regarded as non-proven

The rate of healing in the second and third months was to some extent, related to the rate in the first mont (table VII) The relationship was not close, but complet healing seemed unlikely to be obtained in three month

TABLE VIII—RESULTS OF TREATMENT ASSESSED BY CHANGE IN SIZE OF ULCER CRATER (COMPARISON BETWEEN PATIENT TREATED WITH AND WITHOUT PHENOBARBITONE AN WITH AND WITHOUT ASCORBIC ACID)

Treatment group	No of cases with crater			
	Healed	²/₃ or more healed	Less than ²/₃ healed	Large
		One month after start of treatment		
Phenobarbitone	4	8	16	4
No phenobarbitone	4	9	11	8
Ascorbic acid	4	6	15	7
No ascorbic acid	4	11	12	5
		Three months after start of treatment		
Phenobarbitone	8	11	7	9
No phenobarbitone	9	7	8	8
Ascorbic acid	7	7	5	13
No ascorbic acid	10	11	7	4

TABLE IX—RESULTS OF TREATMENT ASSESSED SUBJECTIVELY BY PATIENTS' SYMPTOMS (COMPARISON BETWEEN PATIENTS TREATED WITH AND WITHOUT PHENOBARBITONE AND WITH AND WITHOUT ASCORBIC ACID)

Treatment group	No of cases with symptoms (for scale see text)		
	0	1	2
		First month	
Phenobarbitone	5	16	11
No phenobarbitone	14	8	10
Ascorbic acid	8	11	13
No ascorbic acid	11	13	8
		Second and third months †	
Phenobarbitone	9	11	12
No phenobarbitone	12	7	13
Ascorbic acid	7	8	17
No ascorbic acid	14	10	8

unless the ulcer had healed to a third of its size in one month

Phenobarbitone and Ascorbic Acid

The results of treatment with phenobarbitone and ascorbic acid are set out in tables VIII and IX. Inspection of the tables is sufficient to indicate that neither drug exerted any beneficial effect on the rate of healing of the ulcers or on the patients symptoms.

DISCUSSION

In the investigation special care was taken to ensure that the patients had equal confidence in all the treatments tested All the patients were examined and treated throughout by one doctor and all were given what were superficially the same medicaments by mouth This appeared to have the desired effect. Inpatient treatment with rest in bed and a "gastric" diet is seen to have produced better results than ambulant treatment with advice to diet according to a prescribed sheet Whether this was due to the rest in bed or to the diet which could be more strictly enforced in hospital is not known It has been suggested that even the modern gastric diet so much more liberal than the old "slop" diets is more restricted than is really necessary and perhaps rest in bed was the essential therapeutic factor Possibly the psychological effect of withdrawing the patients from their home surroundings was also beneficial.

The rate of healing after discharge from hospital was little if at all greater than that in the control group of patients treated as outpatients throughout Such advantage as did accrue may perhaps be attributed to the fact that some of the series A patients continued to stay away from work for a period of "convalescence" (lasting one to three weeks) after discharge from hospital in contrast all the control patients—apart from the few who continued to have incapacitating pain—were working

The practical conclusion to be drawn is that those gastric-ulcer patients whose condition merits admission to hospital should be kept in hospital until healing is complete—that is if it is believed that the patient's prognosis is improved by securing healing of the ulcer Healing may, however, continue with ambulant treatment, should it be impossible to keep the patient in hospital

The proportion of ulcers which healed completely in the present series is small; no more than 8 out of 64 were healed after a month's treatment, and even after three months the total was only 17 These figures cannot, however be compared with many other series, because the most favourable ulcers, those which had healed between diagnosis in outpatients and the initial examination after admission, have been excluded

The disparity between the relief of the patients' symptoms and the extent of healing of the ulcer is of interest A certain parallelism exists but it is notable that some patients had no symptoms while their ulcers increased in size, and others continued to have pain while healing was proceeding actively Such observations underline the need for using an objective method (as well as the subjective one) in assessing the effects of a new treatment for gastric ulcers.

SUMMARY AND CONCLUSIONS

A trial was undertaken to assess the factors influencing the rate of healing of gastric ulcers. Inpatient treatment on a regulated gastric diet was compared with outpatient treatment and advice to follow the diet on a prescribed sheet the effect of added phenobarbitone and ascorbic acid was also determined

Inpatient treatment led to a significantly quicker rate of healing as judged by measurements of the ulcer crater in the radiograph and seemed to be more effective in relieving symptoms It is not known whether the therapeutic factor was rest in bed or the supervised diet

After discharge from hospital, healing usually continued, but the evidence that a course of inpatient treatment exerted any beneficial effect on the subsequent rate of healing is not conclusive. Unless the ulcer had healed to a third of its size in one month it was unlikely to heal completely in three

The giving of phenobarbitone and ascorbic acid did not increase the rate of healing

We are grateful to Dr F Avery Jones for his advice and for allowing us to treat patients referred to his clinic; to all members of the gastro-enterological and radiological departments Central Middlesex Hospital for practical help in the management of the cases; and to Mr P Armitage of the Medical Research Council's Statistical Research Unit for suggesting the use of the method of rank correlation.

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THE SIZE OF FOLLICLES IN NON-TOXIC GOITRE

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NON TOXIC goitre is common in London and a careful observer will not take long in finding numerous examples if he looks about him in any of the city's thoroughfares It seems unlikely that a lack of iodine is primarily responsible, since the Londoner has traditionally included fish in his diet Latterly strict rationing of meat for some ten years has probably increased the consumption of iodine-containing sea food by people of all income levels

In an attempt to follow the metabolism of iodine in this type of goitre patients were given a tracer dose of radioactive iodine and after thyroidectomy sections of the removed glands were placed in contact with photographic film The resulting autoradiograms showed a patchy distribution of the isotope intense blackening being confined to a few discrete areas not necessarily correlated with nodules and the remainder of the gland showing little evidence of iodine uptake (figs 1–3) This is in sharp contrast to the iodine uptake seen in normal thyroid where the autoradiogram presents blackening scattered throughout the entire gland (fig 4)

When a histological survey was made of these discrete areas of iodine uptake it was at once apparent that they showed certain characteristics which distinguished them from the rest of the gland The follicles

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* In receipt of a personal grant from the Medical Research Council

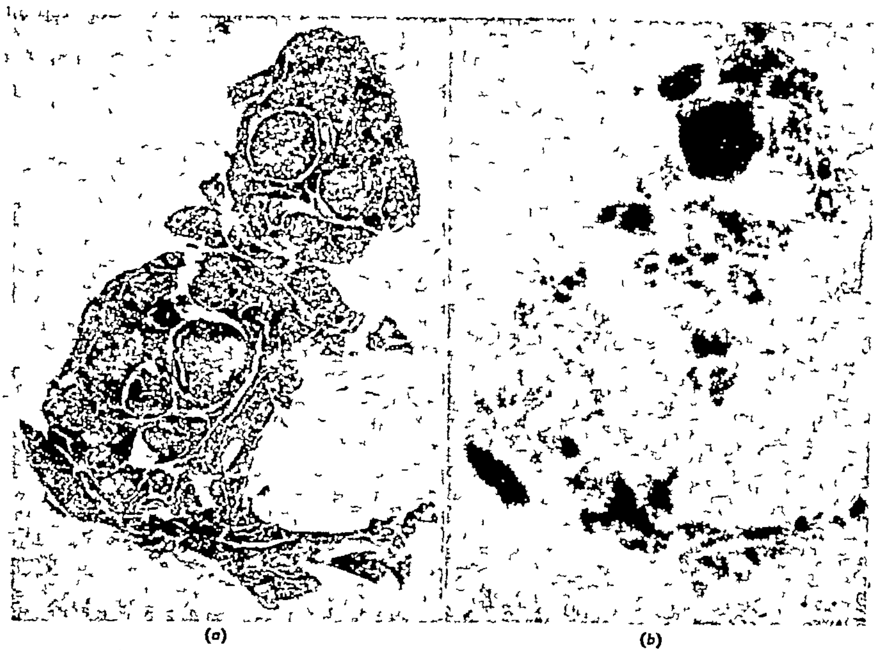
(a) (b)

Fig 1—Nodular non-toxic goitre (a) Section through a complete lobe of the thyroid showing multiple nodules (b) Autoradiogram from this section, showing intense blackening due to uptake of radio-iodine in only a few of the nodules

were of a smaller average diameter and more uniform in size, and the cells comprising the follicle walls were consistently tall The diameters of the follicles in active and non active areas were measured in preparations made from non-toxic goitres removed at operation

METHOD

The patient received 100 µC of I^{131} by mouth whilst fasting, and within 30–50 hours the neck was scanned by a method previously described (Taylor and Stewart 1951) The urine was collected during the first 48 hours, and the urinary excretion of I^{131} determined (Arnott et al 1949) as a measure of over-all thyroid function All the patients investigated fell within the normal range Within 24 hours of scanning, thyroidectomy was performed, the amount of tissue removed being decided by the severity of the pathological process and the age of the patient The excised thyroid tissue was weighed, and thin slices cut from each lobe were fixed in formol saline solution The tissue was subsequently embedded in paraffin wax, and large sections were cut with a sledge microtome The technique wa difficult because nodular goitr is very variable in consistenc the tissue is friable, and the colloid shrinks To add to thes difficulties, calcification was ofte encountered The sections, 5-1 µ thick, were mounted on glas slides and placed in contact wit pieces of 'Kodak' X ray film i light tight containers At 1 day 8 days, and 16 days the film were removed and develope The sections were then staine with hæmatoxylin and eosin

Areas in the sections whic corresponded to the dense blackening on the autoradiograms wer examined microscopically with × 6 eyepiece and $^1/_6$ in objective With a graticule in th eye-piece the diameters of 10 *follicles were measured, two set* of diameters at right angles t each other being recorded control area on the slide wa then chosen in which the autoradiogram showed minima blackening, and a further 20 measurements were made

RESULTS

From a series of goitres investigated by this auto radiographic technique, six were chosen for measuremen in the manner described They were selected becaus they showed no pathological changes other than those o so called simple goitre In addition those showing good contrast on the autoradiograms and well defined cell outlines histologically were preferred, so as to make the task of measuring the follicles as simple as possible The results of these measurements are presented in the accompanying table, from which it will be seen that the average diameter of the inactive follicles is about two or three times that of the active ones

AVERAGE DIAMETERS OF FOLLICLES IN NON TOXIC GOITRE

Case no	Average diameter (µ)	
	Active follicles	Inactive follicles
1	63 2	204 8
2	88 8	201 0
3	86 2	161 7
4	83 1	204 8
5	50 5	140 6
6	50 0	177·4

In addition it is well shown in figs 5 and 6 that the diameters of the active follicles are consistently small in contrast to the wide range of diameters of the inactive follicles

DISCUSSION

The thyroid follicle, which is the secretory unit of the gland, has been the subject of much study in the past, and its size has been investigated in normal and pathological states by many workers No one, however, seems to have had the advantage of being able to relate size and function as has now been made possible

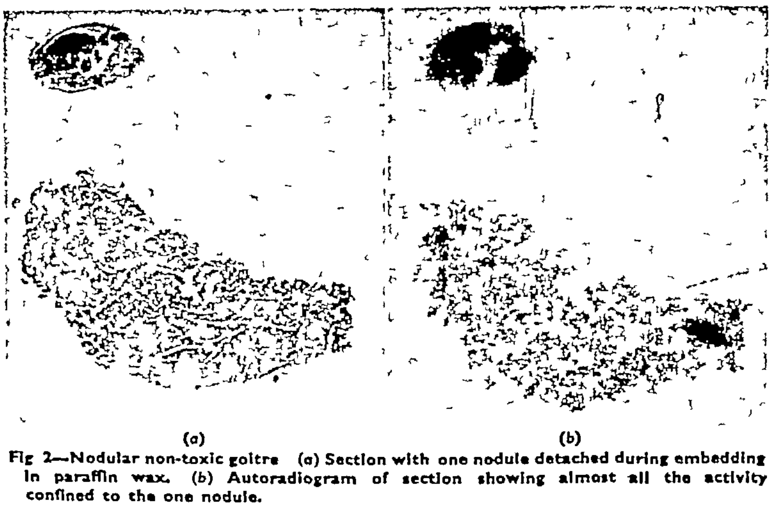
(a) (b)

Fig 2—Nodular non-toxic goitre (a) Section with one nodule detached during embedding in paraffin wax. (b) Autoradiogram of section showing almost all the activity confined to the one nodule.

by using autoradiography. Wilson (1927) made wax reconstructions of serial sections of ten thyroids and found that the normal thyroid follicle is more or less discrete round, oval, or budded, and has an average diameter of 300 μ. The follicles in normal thyroid tissue varied less in size than those examined in any variety of diseased gland. In diffuse colloid goitre they retained their normal shape but might increase from three to five *times in size by passive dilatation coalescence or budding.* In Graves's disease Wilson described the follicles as having an average diameter of 417 μ. Jackson (1931) used a different technique: he macerated small pieces of thyroid tissue in 75% hydrochloric acid which produced a suspension of follicles. These were washed and placed in a type of counting chamber where their diameters could be determined. His average size for follicles of normal thyroid was 163.24 ± 1.17 μ; for Graves's disease it was 168.78 ± 0.67 μ, and for simple goitre 244.5 ± 1.60 μ.

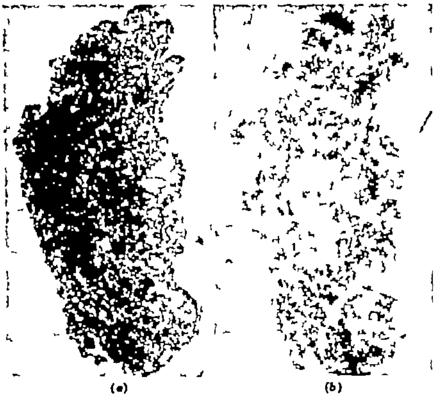
(a) (b)

Fig. 3—Non-toxic goitre. (a) Section through lobe with many large follicles filled with colloid. (b) Autoradiogram of section showing blackening due to uptake of radio-iodine mainly confined to one small area, not nodular but composed of uniformly small follicles.

In the present study it was found that those areas of the gland which showed uptake of radioactive iodine presented follicles of remarkably uniform diameter. It is interesting that discrete islands of tissue should function in this way and it is an observation which is readily correlated with the well known habit of the thyroid to form nodules, the so-called adenomata. *It might be* postulated that only follicles of a certain critical size are suitable targets for the thyroid stimulating hormone (T.S.H.) of the anterior pituitary. If this were so it would leave unexplained the observation that such follicles are typically found grouped together. Possibly the distribution of blood vessels in the thyroid is partly responsible.

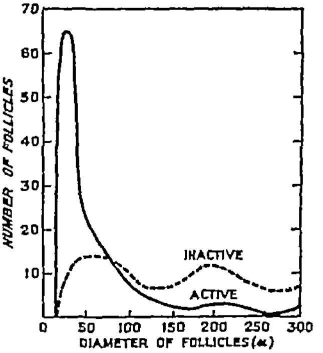

Fig. 5—Distribution of follicles in active and inactive areas of thyroid. Note uniformly small follicles in active area and wide scatter of diameters in inactive area (case 1).

From the diffusely scattered iodine uptake seen in autoradiograms of normal thyroid tissue it has been postulated that each *follicle has a natural cycle of alternating activity and rest.* Williams (1937, 1939, 1941, 1944) studied living thyroid tissue in animals by transillumination and also by transplants made in a transparent chamber mounted in the rabbit's ear. He described how each follicle passed through a cycle of secretion, colloid release, partial collapse, and recuperation. He reported that few follicles appeared active at any one time.

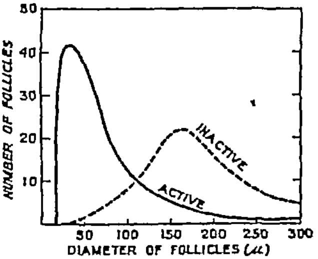

Fig. 6—Distribution of follicles in active and inactive areas in case 2, showing smaller difference in follicle diameters in active and inactive areas.

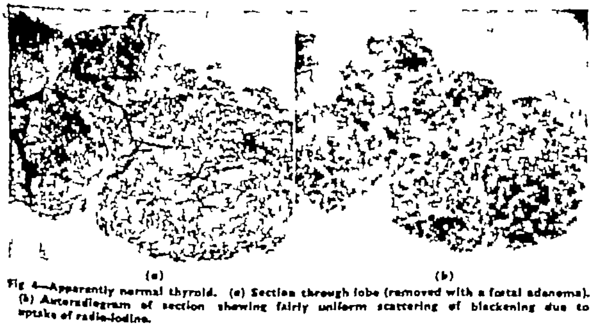
(a) (b)

Fig. 4—Apparently normal thyroid. (a) Section through lobe (removed with a fœtal adenoma). (b) Autoradiogram of section showing fairly uniform scattering of blackening due to uptake of radio-iodine.

From the present work it appears that in non-toxic goitre most of the thyroid follicles become incapable of taking part in normal thyroid *function and that small discrete* groups of follicles are producing all the body's requirements of thyroid hormone. A vicious circle may well be set up, for nodules exhibiting increased activity are likely to undergo central necrosis and hæmorrhage (Dobyns and Lennon 1948); thus area after area of the gland may become exhausted and eventually go on to cyst formation.

It is not known at what stage in the development of a goitre this restriction of function to discrete areas takes place. The surgical specimens removed in the present series showed gross enlargement and advanced pathological changes, and there have been no indications for excising small goitres which might show intermediate stages in the evolution of this condition

SUMMARY

Patients with non toxic goitre were given tracer doses of radio iodine, and autoradiograms were prepared from the tissues removed at thyroidectomy

The iodine uptake was mainly localised in small discrete areas

The follicles in these active areas were smaller and of a more uniform diameter than those in the remainder of the gland

It is a pleasure to record my indebtedness to Prof Ian Aird, in whose department this work was done, and to many colleagues, in particular Dr I Doniach of the department of pathology The photomicrographs are the work of Mr E V Willmott, F I.B P, F R P S Finally the technical assistance of Miss Margaret Tomlinson made this investigation possible

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THE EFFECT OF MEPHENESIN IN SPASTIC PARALYSIS

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Mephenesin ('Myanesin') was introduced by Berger and Bradley in 1946 when they showed that its principal action was depression of the spinal cord It was later shown by Berger (1947), Henneman et al (1949), and Kaada (1950) that the action was on the internuncial neurones Thus polysynaptic neural circuits were depressed, and monosynaptic circuits remained unaffected at ordinary doses

Spasticity is a condition of hyperactive stretch-reflexes with after discharge and a tendency for impulses to irradiate in the spinal cord (Magoun and Rhines 1947) Therefore mephenesin might be expected to depress this hyperactivity and allow the patient to use what voluntary power he has to better advantage

It is still not clear what place mephenesin has in the treatment of spastic paralysis, therefore the present investigation was undertaken

MATERIAL

27 patients were collected The cases were disseminated sclerosis (6), cerebrovascular accident (6), motor-neurone disease (4), traumatic hemiplegia (2), spinal-cord compression (2), cerebral tumour (1), syphilitic paraplegia (1), syringomyelia (1), familial spastic paralysis (1), and spastic cases of doubtful origin (3)

METHODS

24 patients were admitted to hospital, and 3 were treated as outpatients In all cases the mephenesin was given orally as an elixir four times a day after meals, and again during the night if the patient complained of symptoms due to the spasticity The dose was steadily increased, usually daily, until toxic manifestations appeared. It was then reduced by an amount corresponding to 0 5–1 0 g of mephenesin per dose, and this was regarded as the largest tolerated dose, this was 6–18 g a day, with an average of 10 5 g a day Treatment was continued at this level for at least seven days This time was considered to be adequate because there is no cumulative effect and mephenesin is very rapidly metabolised and excreted, hence the greatest effect should occur soon after taking the drug Berger and Schwartz (1948) stated that the maximum benefit occurred after two or three days' therapy

Frequent clinical examinations were made If the patient claimed improvement, a control mixture was substituted for the active mixture without the patient's knowledge The mephenesin elixir contained 1 g of mephenesin in 15 ml of elixir and 35% ethyl alcohol V in V The control elixir was of identical composition except that it contained no mephenesin

10 of the patients were also examined before and after intravenous injections of mephenesin (5% solution), and electromyographic studies were made in Dr Philippe Bauwens's department with the collaboration of Dr A. T Richardson

EFFECTS OF ORAL MEPHENESIN

The results may be summarised as

	Cases
No improvement	17
Modification of neurological state, but with no true benefit to patient	8
Definite improvement	2

Of the 27 patients who received protracted treatment with mephenesin in the largest tolerated dose the absence of improvement was so obvious in 15 that it was unnecessary to use the control mixture at all In 12 cases the control mixture was substituted, but in only 2 of these was there a relapse, and these alone can be claimed as showing genuine improvement

(1) The first of these was a man, aged 28, with a severe spastic paraplegia since the age of 8 years He is classified above under cases of doubtful origin. He had good voluntary power underlying his spasticity and since taking mephenesin has had a reduction in spasticity and has found that his shoe toes wear out less quickly and that he can leave his house later in the mornings because he gets to the bus stop sooner His gait is still very spastic He takes 14–16 g of mephenesin a day and has been doing so for a year

(2) The second was a man, aged 65, with a paraplegia due to spinal-cord compression caused by Paget's disease He had severe flexor and adductor spasms and cramps which were almost completely relieved for two hours after a dose of mephenesin His wife says she can get his trousers on and off, usually a difficult slow task, in half the time if he has had a dose of mephenesin shortly beforehand. He is no longer kept awake at night by painful spasms and cramps. He has taken about 10 g of mephenesin a day for a year

Two other patients with flexor spasms were not improved by mephenesin

In 8 cases it was considered that there was a definite alteration in physical state during treatment with mephenesin a previously easily elicited clonus was abolished and spasticity reduced, but without significant benefit to the patient

A single large dose of about 5 g of mephenesin can produce changes similar to those produced by intravenous mephenesin, but the effects are less The changes last up to two hours

EFFECTS OF INTRAVENOUS MEPHENESIN

Clinical

Spasticity was always much reduced or completely abolished for about half an hour The effect was much more dramatic in the legs than in the arms

Clonus was abolished or reduced to a few weak jerks where previously it had been brisk and sustained

Flexor spasms (2 cases) were hardly affected in one case, although spasticity was reduced, in the other case they could not be elicited even on strong stimulation of the leg where before they had occurred apparently spontaneously

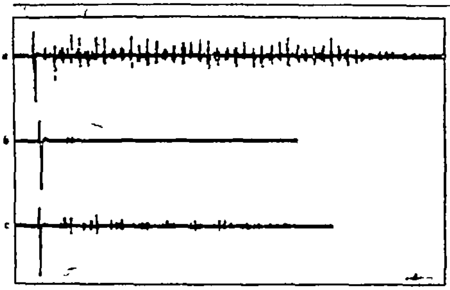

Fig 1—Electromyograms of knee-jerk from quadriceps muscle before (a) 20 minutes after (b) and 40 minutes after (c) intravenous mephenesin 1 g

Voluntary power was unaffected in all cases. Power was tested by asking the patient to repeat, after administration of the drug manoeuvres which he had performed before and which required his full strength The tests used varied according to the condition of each patient and the assessment was made on clinical grounds

Electromyographic

The after-discharge of the knee jerk which is characteristic of *spasticity* was almost completely abolished, leaving the amplitude of the knee jerk action potential unaffected The effect was shortlived (fig 1)

The response to attempts to elicit patellar *clonus* are shown in fig 2 The first deflection in each record is due to the applied stimulus.

These results were obtained in each of the 10 patients examined

SIDE EFFECTS

Oral Mephenesin

Sleepiness followed the administration of oral mephenesin but was less than after intravenous mephenesin. The patients sometimes complained of feeling 'muzzy' or "dizzy" for half an hour after a dose, especially when mephenesin was taken on an empty stomach This side-effect was the principal factor limiting the dose Two patients taking the largest tolerated dose after meals accidentally received it on an empty stomach one collapsed and the other had to be assisted back to bed Both recovered in a very few minutes.

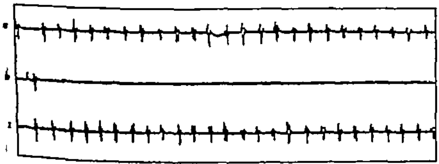

Fig 2—Electromyograms of patellar clonus from quadriceps muscle before (a) 20 minutes after (b) and 40 minutes after (c) intravenous mephenesin 1 g

Incontinence of fæces occurred in 3 patients and ceased as soon as mephenesin was withheld

Vomiting occurred in 2 patients

Euphoria though perhaps not a toxic effect was very striking in 1 patient who said she never felt happier in her life than when taking mephenesin elixir She did not complain when it was withheld

One patient who had been noticeably quiet and uncommunicative before starting treatment developed florid *schizophrenia* after about a week He responded well to psychiatric treatment and it was thought that mephenesin was probably a precipitating factor

There has been no sign of *chronic toxicity* in 2 patients who have been taking mephenesin in fairly heavy dosage for a year

No hæmoglobinuria occurred during oral administration

No side-effects occurred as a result of taking the control elixir

Intravenous Mephenesin

Hæmoglobinuria occurred in 1 patient after the injection of 5% mephenesin 1.5 g The solution also contained 12% ethyl alcohol and 7.5% propylene glycol and was injected over about four minutes The hæmoglobinuria was seen when the patient micturated an hour after the injection and again six hours later after that the urine was normal in colour The presence of hæmoglobin in the urine was confirmed spectroscopically No ill effects followed.

Feelings of *heat, dizziness* and *sleepiness* occurred with each injection and passed off in 10–30 minutes. Two patients slept for a few minutes when told to rest with their eyes shut

Nystagmus was invariably present for a few minutes after injection

NEOSTIGMINE

There is evidence that anti-cholinesterase drugs depress the central nervous system (Schweitzer and Wright 1937 Kremer 1942) and they have been used clinically for this purpose It was decided to try to supplement the depressant action of mephenesin by neostigmine given by mouth Neostigmine was given to 5 patients when they had failed to improve on mephenesin alone It was given up to the largest tolerated dose with no beneficial effect in any patient

DISCUSSION

The mode of action of mephenesin is mentioned above A neuromuscular blocking action can be demonstrated experimentally with nearly lethal doses but doses producing reversible paralysis in animals have no blocking effect on the myoneural junction this paralysis is produced by depression of the spinal cord (Berger 1947)

It is not to be expected that any real benefit will be produced in spastics by using neuromuscular blocking agents such as curare and decamethonium because in practice reduction of spasticity is accompanied by reduction of voluntary power This is not the case with the group of spinal cord depressant drugs of which mephenesin is at present the principal representative

Clinical studies (Stephen and Chandy 1947 Berger and Schwartz 1948 Schlesinger 1948 Schlesinger et al 1948 Denhoff et al. 1949, Barnard 1949 Bickers et al 1950 Frantz 1950 Effron and Schultz 1951) have not shown conclusively what place if any mephenesin has in the treatment of spastic paralysis There are various reasons for this Some of the trials were on inadequate numbers of patients In the absence of any means of measuring spasticity satisfactorily controls were not always used to differentiate between real improvement and that due to psychological effects which are liable to be considerable in paralysed patients When mephenesin did not produce benefit it was not always given up to the limit of the patient's tolerance

Attempts were made in the present investigation to measure spasticity by a modification of the method described by West (1932) and by examining the patient's ability to perform alternating movements at an increasing rate before and after mephenesin It was not found possible to obtain useful information by these methods because the results were too variable and changes in the patient's neurological state produced by mephenesin were not necessarily accompanied by a useful improve ment in ability This latter observation is in agreement with that of Denhoff et al (1949)

Henneman and Scherrer (1949) considered that the variability of results in previous clinical trials of mephenesin might be due to variation in the site of lesions causing spastic paralysis They investigated the effect of mephenesin on experimentally induced spasticity in cats and found that the site of the lesion did not affect the response mephenesin being effective in reducing spasticity in all cases In view of these findings it was decided that the only criterion in the selection of cases for a clinical trial should be the presence of spasticity in one or more limbs

With mephenesin it is possible in most cases to abolish spasticity completely without impairing voluntary power at all Unfortunately this can only be done reliably by giving intravenous mephenesin, oral mephenesin being relatively ineffective, probably owing to its rapid metabolism (Berger 1949)

Intravenous mephenesin is useless for therapeutic purposes owing, not only to the brevity of its action but also to the side effects, such as sleepiness and "dizziness," which are severe enough to prevent the patient from taking advantage of his temporary release from spasticity The significance of the nystagmus is not clear

Oral mephenesin, in spite of its brief action, was only given four, or sometimes five, times a day, because it was felt that a drug requiring more frequent administration would be unsuitable for general clinical use in view of the fact that, if effective, it would have to be taken indefinitely

Although mephenesin is unsuitable for widespread clinical use in spastic paralysis, the results in two patients were gratifying, particularly in the man with painful flexor spasms, a symptom notoriously difficult to control The lack of effect in 2 other cases with flexor spasms was disappointing, but the unequivocal symptomatic relief of this patient warrants further trial

The results achieved with mephenesin give hope that further research will provide a drug with a similar action but without its disadvantages

Intravenous mephenesin has achieved notoriety as a hæmolytic agent, particularly when a 10% solution is used Pugh and Enderby (1947) reported that a small and usually insignificant amount of hæmolysis followed injections of 5% but not 1% solutions Hewer (1948) found that a 1% solution caused hæmolysis in a cat, this being greater if the solution was diluted from the 10% commercial preparation containing propylene glycol and alcohol than if it was a 1% solution in physiological saline solution

That a very large intravenous dose of a dilute solution may be given without producing harm is shown by the case of a child, aged $1^1/_2$ years, with tetanus in this hospital under the care of Dr J Forest Smith On the first three days of treatment this child received 12 g, 13 g, and 12 g of mephenesin at a strength varying between 0 5% and 2 0% There was no hæmoglobinuria or other ill effect In giving doses of this size it is worth remembering that the commercial preparation for parenteral use contains 2 4 ml of ethyl alcohol per g of mephenesin

Schlesinger (1948) reported cases of hæmoglobinuria following oral mephenesin This is the only report so far, and hæmoglobinuria does not seem to be a significant risk with oral mephenesin nor is it a serious risk with intravenous mephenesin if the solution is $2^1/_2\%$ or less

Mephenesin is a local anæsthetic, Newhouse et al (1950) report 2 cases of tetanus in one of which the throat became anæsthetised and the mixture was inhaled Only 1 patient in this series was dysphagic, and he took the mephenesin without any complications, but it is reasonable to suppose that this complication might arise in any patient who cannot swallow the mixture fairly quickly

SUMMARY

Intravenous mephenesin produced good muscular relaxation of short duration in each of 10 cases of spastic paralysis without diminishing voluntary power

Oral mephenesin given to the limit of tolerance was of benefit to 2 out of 27 patients, although it alters neuro logical signs in many cases, without improving the patient's performance

The mode of action and toxic effects of mephenesin are discussed

I wish to thank Dr Philippe Bauwens, Dr A. C Dornhorst Dr J St C Elkington, Dr A T Richardson, Prof. E P Sharpey Schafer, and Dr R S Stacey for advice and assist ance, the physicians who allowed their cases to be treated and the nursing sisters of Albert and Charity wards a St Thomas's Hospital for their coöperation British Dru Houses Ltd supplied the myanesin elixir and compounde the control elixir

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METABOLIC EFFECTS OF TOTAL PANCREATECTOMY IN MAN

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OPPORTUNITIES for detailed metabolic study depancreatised humans have been few In the twenty fiv recorded cases in which total pancreatectomy has bee successfully accomplished only ten patients survive long enough to allow adequate study of their diabete their hæmatology, and their protein and fat absorptio

Priestley et al (1944) described a patient who survived tota pancreatectomy for islet-cell adenoma and whose subsequen insulin requirement was 20–30 units daily Her defective fa absorption was not improved by pancreatin, but a substanti decrease in fæcal nitrogen loss followed its administration

Brunschwig et al (1945) and Ricketts et al (1945, 1946 described a diabetic who underwent total pancreatectomy fo carcinoma and whose insulin requirement after operation wa less than it had been before

Goldner and Clark (1944) studied the diabetes of two o Brunschwig's cases of total pancreatectomy and stresse their insulin sensitivity and their low insulin needs

Whipple (1946) recorded the case of a young woman whos pancreas he removed for chronic pancreatitis with calcul and whose postoperative insulin requirement was 30-7 units daily and whose fat absorption was 76%, increasing t 83% with pancreatin

Workers at the Mayo Clinic (Waugh et al 1946 Dixon et al 1946) published a very complete metabolic study on a patient who survived total pancreatectomy for carcinoma and emphasised the low insulin requirement and the effect of pancreatin in improving the absorption of protein and fat Their three other cases showed similar tendencies.

Fallis and Szilagyi (1948) also noted that three patients who survived total pancreatectomy required little insulin.

Two of us (A G and A G W W) have reported elsewhere the clinical, operative and pathological details of a man aged 55 who has survived total pancreatectomy for over 2 years We here record the metabolic and hæmatological studies carried out on this patient

EFFECTS OF LOSS OF EXTERNAL PANCREATIC SECRETION

Fat Absorption

No preoperative studies of fat absorption were made Details of postoperative fat absorption are shown in table I. It will be seen that with small doses of pancreatin (1 5 g per day) fat absorption was only 38% whereas with large doses (11 5 g per day) it increased to 83%. From the clinical as opposed to the biochemical aspect there was no actual diarrhœa without pancreatin, there were not more than 3 stools per day but they were bulky and ill formed. The effect of the drug was to decrease the bulk and render the consistence of the fæces more normal, with only slight reduction in the frequency of bowel action

TABLE I—FAT ABSORPTION

Daily diet 200 g. carbohydrate 75 g fat, protein unlimited. Total fat intake for the 72 hours of the test = 225 g

Fate of fat in diet	—	1 5 g pancreatin daily		11 5 g pancreatin daily	
		Weight (g)	% of total intake	Weight (g)	% of total intake
Absorbed		85	38	187	83
Excreted in fæces	Total fat	140	62	38	17
	Neutral fat	14	6	6	3
	Free fatty acids	102	45	7	3
	Soaps	24	11	25	11

The previously published figures for fat absorption in depancreatised humans are compared with our own findings in table II. All the cases show clearly that the loss of external pancreatic secretion produces as would be expected a gross defect in fat absorption On our patient this defect was greatly reduced by large doses of pancreatin, which was also the experience of the workers at the Mayo Clinic The fact that Priestley et al (1944) found only a slight diminution in fat absorption following very large doses of pancreatin may be due to the well known variation in potency of pancreatic extracts

It appears probable that a substantial amount of healthy pancreatic tissue is necessary for fat absorption to proceed normally Another patient of ours who underwent subtotal pancreatectomy for carcinoma showed a postoperative fat absorption of only 71% The tail of the pancreas remained and the stump had been anastomosed to the jejunum Though intubation for lipase assay proved impossible it is reasonable to presume that, since no fistula was present, the anastomosis functioned satisfactorily

Protein Absorption

Estimations of protein absorption were not made before operation Details of postoperative nitrogen balances are given in table III which shows that pancreatin did not improve the nitrogen balance; in fact it appeared to reduce the amount absorbed Our own findings are compared with those of previous writers in table IV Priestley et al (1944) Dixon et al (1946) and Fallis and Szilagyi (1948) all found that a diminution in fæcal nitrogen loss and an improved nitrogen balance followed the administration of pancreatin, but urinary nitrogen excretion was not affected The failure of pancreatin to reduce the fæcal nitrogen and improve the nitrogen balance in our case cannot be explained It would not appear to be due to lack of potency of the drug since the same preparation materially improved fat absorption

TABLE II—COMPARISON OF FAT ABSORPTION IN PUBLISHED CASES

Author	Daily fat intake (g)	Percentage absorption		
		Without pancreatin	With pancreatin	
			(g daily)	
Priestley et al (1944)	102 5 85	65	28	58
Whipple (1946)	75	76	"3 pancreatin tablets after each meal"	83
Dixon et al (1946)	100	52	16	75
Fallis and Szilagyi (1948)	100		4	77
Whitfield Gourevitch and Thomas (1952)	75		1 5 11 5	38 83

CARBOHYDRATE METABOLISM

No blood sugar estimations were carried out on our patient before operation but repeated examination of his urine showed no reducing agents and it therefore seems probable that he did not have diabetes This assumption is supported by the fact that the islet tissue in his pancreas was histologically normal His postoperative insulin requirements are shown in table V which also includes similar data from the previous cases The most striking feature of our own and other cases is the small amount of insulin required to control the diabetes despite high carbohydrate intake Often 50 units per day or less—often substantially less—sufficed Where larger amounts were required an active infective process seems at times to have been responsible One of Whipple's cases (Whipple 1946) had active pulmonary tuberculosis and our own patient had repeated attacks of ascending cholangitis until cholecystjejunostomy was performed at a second operation

TABLE III—NITROGEN BALANCES

24 hour intake (g)			Daily pancreatin dosage (g)	24 hour nitrogen intake (g)	24 hour nitrogen excretion (g)			Nitrogen balance
Protein	Fat	Carbohydrate			*Urine*	*Fæces*	Total	
100	75	180	Nil	16·0	5 7	5 3	11 0	+5·0
100	75	180	4 30	16 5	6 5	7·0	13 5	+3·0
100	75	200	7 5	16 8	8 5	5 5	14 0	+2·8

Ricketts et al. (1946) and Fallis and Szilagyi (1948) recorded instances of total pancreatectomy in known diabetics and the postoperative insulin requirement was less than it had been before Defective absorption may well be an important reason why depancreatised humans need so little insulin but it seems likely that the current view that islet-cell deficiency is not wholly responsible for diabetes is correct.

The insulin sensitivity of depancreatised patients has been stressed by Rockey (1943) Goldner and Clark (1944) Ricketts et al. (1945) and Fallis and Szilagyi

(1948) Rockey's case (Rockey 1943) went into hypoglycæmic coma the day after operation, and one of the cases recorded by Waugh et al (1946) died from hypoglycæmia. Our patient has had mild hypoglycæmic reactions occasionally, but these have certainly been no more obtrusive than in ordinary diabetics. The fact that he was highly intelligent and coöperative may explain the lack of more dramatic hypoglycæmic episodes despite strict diabetic control.

HÆMATOLOGICAL EFFECTS

The authors we have quoted made no special referen to the hæmatological effects of total pancreatectom The postoperative blood picture in our own patient shown in table VI. The leucocytosis can be attributed splenectomy, to the two hæmatemeses during the imm diate postoperative period, and to the attacks of ascendin cholangitis that dogged the patient for 16 months aft operation. The interesting feature is the tendency

TABLE IV—COMPARISON OF NITROGEN BALANCES IN PUBLISHED CASES

Author	24 hour intake (g)			Daily pancreatin dosage (g)	24 hour nitrogen intake (g)	24 hour nitrogen excretion (g)			Nitrogen balance
	Protein	Fat	Carbohydrate			Urine	Fæces	Total	
Priestley et al (1944)	94 68 70	70 102 92	243 206 222	Nil Nil 28	15·1 10·8 11·9	5·3 5·9 5·5	8·3 4·1 2·9	13·6 10·0 8·4	+ 1·5 + 0·8 + 3·5
Ricketts et al (1946)	102	11	401	Nil	16·0	4·7	12·3	17·0	− 1·0
Dixon et al (1946)	120 120 120	100 100 100	271 271 271	Nil 15 Nil	19·3 21·0 19·3	12·1 14·0 12·8	6·6 3·5 5·9	18·7 17·5 18·7	+ 0·6 + 3·5 + 0·6
Fallis and Szilagyi (1948)	90* 150	93 100	300 250	Nil 4	14·4 24·5	6·5 6·8	6·3 2·2	12·8 9·0	+ 1·6 +15·5
Whitfield, Gourevitch, and Thomas (1952)	100 100 100	75 75 75	180 180 200	Nil 4·36 7·25	16·0 16·5 16·8	5·7 6·5 8·5	5·3 7·0 5·5	11·0 13·5 14·0	+ 5·0 + 3·0 + 2·8

* Preoperative

TABLE V—INSULIN REQUIREMENTS OF DEPANCREATISED HUMANS

Author	24 hour diet (g)			Post-operative period (days)	Daily insulin requirement (units)	Remarks
	Protein	Fat	Carbohydrate			
Rockey (1943)	60	60	100	3–15	27	Hypoglycæmic coma the da after operation
Goldner and Clark (1944) (1) (2)			150–200 150–200	1–11 1–10	50 40	
Brunschwig et al. (1945)	102	11	401	60	30–40	
Priestley et al. (1944)	94	70	243	120	20–30	
Waugh et al (1946) (1) (2) (3)	125 107 75	103 100 101	267 272 250		26–32 40 38	 Died from hypoglycæmia
Zinninger (1946)				1	30–50	
Whipple (1946) (1) (2)	70	75	300	180 1–7	30–70 50–90	Active pulmonary tuberculosis
Kennedy et al. (1947)				1–18	15–20	
Fallis (1947)				1–6	15–30	
Fallis and Szilagyi (1948) (1) (2) (3)	120 120 150	60 70 100	200 250 250	 1–80 1–90	28 20 10	
Gaston (1948)				1–8	12	
Whitfield, Gourevitch, and Thomas (1952)	100 Unlimited Unlimited	75 75 75	180 200 240	39–50 51–222 222–740	20–40 30–54 48–60	

TABLE VI—BLOOD PICTURE AFTER TOTAL PANCREATECTOMY

Postoperative day	Red blood-cells (millions)	Hæmoglobin (%)	White blood-cells	Neutrophil polymorphonuclear cells (%)	Mean cell volume (c µ)	Mean corpuscular hæmoglobin concentration (%)	Remarks
Preoperative	4·51	92	8300	75·0			
12	4·17	86	24,300	90·7			2 hæmatemeses on 9th day Total 14 o Transfusion 2 pints on 11th day
27	3·63	78	10,900	73·7	100·3	31·3	'Plexan' 2 ml weekly
50	4·57	98	5950		97·4	31·3	Plexan 2 ml weekly
89	5·10	104	12,000	70·7	90·1	30·8	Plexan 2 ml. weekly
131	4·56	100	13,000	64·7	99·3	30·4	Plexan 2 ml fortnightly
224	4·81	102	13,000	62·3	98·5	29·9	Plexan 2 ml fortnightly
313	5·37	114	15,500	77·3	93·1	31·4	
404	4·91	98	10,300	78·3			
733	5·23	108	9000	61·0	90·8	31·3	

macrocytic anæmia This may have resulted from the effect of the recurrent cholangitis on hepatic function but it must be added that each attack of cholangitis was controlled within a matter of hours by penicillin and sulphonamide therapy, and liver function tests showed no abnormality

SUMMARY

1 In a man who has survived total pancreatectomy for over 2 years, observations were made on the absorption of protein and fat, the insulin requirements and the blood picture

2 The gross defect in fat absorption was greatly reduced by large doses of pancreatin

3 The nitrogen balance was not improved by pancreatin

4. The blood showed a slight macrocytic anæmia

We are greatly indebted to Dr A L P Peeney for the hæmatological reports in this case.

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EFFECT OF ADRENOCORTICOTROPIC HORMONE ON CLINICAL AND EXPERIMENTAL HÆMOLYTIC ANÆMIA

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Dameshek et al (1951) report dramatic clinical and hæmatological responses in four out of five patients with acquired hæmolytic anæmia treated with pituitary adrenocorticotropic hormone (A C.T H) Three of these patients had hæmolytic anæmia of the 'symptomatic' variety; all had circulating antibodies Dameshek et al suggest that these favourable results may have been brought about by the lympholytic action of A C.T H the agglutinins probably being produced in the lymphoid tissue.

Palmer (1950) reports that A.C.T.H and cortisone suppressed the anæmia and leucocytosis present in rats receiving small doses of anti rat red-cell rabbit serum.

Dameshek (1950) reports that two patients with hæmolytic anæmia secondary to lymphosarcoma showed a definite hæmatological response to A.C.T.H. Discontinuance of this therapy led to relapse Two cases of "idiopathic" acquired hæmolytic anæmia which had not responded to splenectomy also showed a beneficial response In all four cases no further transfusions were necessary

Gardner (1950) reports three cases of acquired hæmolytic anæmia treated with A.C.T.H One patient a girl aged 5 years, showed considerable improvement but in the other two the response was slighter but they responded to a second course of A.C T H

Davidson et al (1951) describe the effect of A C.T.H in three cases of hæmolytic anæmia. Two of the anæmias were of the congenital form and the other of the acquired form considerable improvement was noted in the latter whereas the congenital hæmolytic anæmias showed little response

The work reported here was done in an attempt to elucidate the mode of action of A C.T H in acquired hæmolytic anæmia

CASE RECORDS

Case 1.—The patient was a spinster of 72 with no family history of hæmolytic anæmia About three years previously she had begun to have increasing pallor fatigue and palpitations. Iron and liver therapy was prescribed by her doctor but she grew gradually worse and was admitted to the Musgrave Clinic Belfast, in April 1951 Acquired hæmolytic anæmia in crisis was diagnosed and transfusion therapy commenced but this had only very temporary effects

Blood examination on April 23 showed Hb 42% red cells 1 660 000 per c.mm and reticulocytes 26% A peripheral blood film showed much spherocytosis. Normoblasts numbered 28 per 1000 white cells. The erythrocyte osmotic fragility was greatly increased A direct Coombs test was strongly positive The serum bilirubin level was 0·62 mg. per 100 ml. Wassermann and Kahn reactions were negative

Treatment and Progress —On April 23 treatment was begun with A C T.H 100 mg daily (25 mg six hourly) Twenty four hours later the reticulocyte-count had risen to 51 4% but throughout the period of treatment the hæmolytic process showed no sign of abatement. By the tenth day of therapy the serum bilirubin level had risen to 1 25 mg per 100 ml., which seemed to indicate that the breakdown of red cells had in fact been accelerated The amount of hæmoglobin had increased by 10% to 52%. This increase could be explained by the increased blood regeneration (table I)

The patient was discharged from hospital on May 4 but was seen again three weeks later when her blood revealed no significant changes from the last investigation A Coombs test was still strongly positive and the hæmoglobin remained at 52%

Case 2 —A single woman, aged 55; no family history of hæmolytic anæmia was obtainable Her history dated back to August 1948 when she was admitted to the Royal Victoria Hospital, Belfast with a history of gradually increasing weakness and ulceration of the legs At that time her scleræ showed a definite icteric tinge and an enlarged firm spleen was palpable The liver was enlarged to about three finger breadths below the costal margin. The Kahn and Wassermann reactions were strongly positive. Peripheral blood examination showed the typical changes of acquired hæmolytic anæmia

TABLE I—HÆMATOLOGICAL FINDINGS IN CASE 1 TREATED WITH A C.T H

Date 1951	Hb %	Red cells (million per c mm)	White cells (per c.mm)	Hæmatocrit	Mean corpuscular volume (cμ)	Reticulocytes %	Eosinophils (per c mm.)	Red-cell osmotic fragility (strength of saline solution in which hæmolysis began)	Serum bilirubin (mg per 100 ml)	Coombs test	Treatment
April 19	38	1 58	8600	17	108	20		0 74 %		+3	
April 23	42	1·66	9000			26	100	–	0·62	+3	A C.T.H. 25 mg 6 hourly
April 24	40	1 35	7750			51	20				
April 25	47	1 78	6000			42	<20				
April 26	43	1·81	9600			49	<20				
April 29	52	1 95	9500	22	113	38	40	0 74 %	1 37	+3	
May 3	52	2·01	9100	22	109	37	150	0·74 %	1 25	+3	
May 4											A C T.H. discontinued
May 25	52	2 15	7200	32	102	40		66 %		+3	

with spherocytosis, reticulocytosis, increased serum bilirubin level, increased erythrocyte fragility, and a positive direct Coombs test Acquired hæmolytic anæmia with concomitant syphilis was diagnosed Intensive penicillin therapy was begun but did not alter the rate of hæmolysis or the serological reactions The patient refused to undergo splenectomy and was discharged from hospital and subsequently maintained by intermittent blood-transfusions

On April 23, 1951, she was readmitted to hospital

Blood examination on May 14 showed Hb 67%, red cells 2,660,000 per c mm , reticulocytes 23 4%, serum bilirubin level 1 3 mg per 100 ml , direct Coombs test positive, Wassermann reaction ++, Kahn test +3 A differential count on the cells in the peripheral blood showed the neutrophils to be 78%, eosinophils 1%, lymphocytes 15%, monocytes 6%, and spherocytes numerous The erythrocyte fragility was much increased (table II)

Treatment and Progress—On May 15, therapy was begun with 25 mg six-hourly It was soon obvious that a remarkable improvement was taking place Six days after the start of the treatment the amount of hæmoglobin had increased to 89% The ACTH was stopped, but the improvement continued Two weeks after the withdrawal of ACTH the hæmoglobin was 95%, and the serum bilirubin had dropped *to 0 70 mg per 100 ml The reticulocytes were at the lowest* level ever recorded in this case (7 4%), and the osmotic fragility showed a considerable decrease towards normal The Coombs test, oddly enough, gave the strongest reaction yet obtained with her cells

The patient when last seen said she was in excellent health The serological tests for syphilis, however, still remained strongly positive

EXPERIMENTAL WORK

To investigate the action of ACTH in hæmolytic anæmia more fully, it was decided to study its action in guineapigs undergoing acute hæmolytic crises brought about by the injection of anti-red-cell sera after the manner of Dameshek and Schwartz (1938) Experiments were also made to see whether cortisone could suppress antibody formation or interfere with the antigen-antibody union

Three young adult rabbits were given 1 ml. of a 20% suspension of thrice washed guineapig red cells intravenously every three days for five injections, and bled a week after the last injection Over the same period of time two of these rabbits received daily intramuscular injections of 0 3 ml of Merck's saline suspension of cortisone acetate containing 25 mg per ml —i e, each rabbit received 7 5 mg of cortisone acetate daily

Titration of the antisera was by serial dilutions in physiological saline solution Fresh pooled guineapig complement diluted 1 10 and 2% guineapig red-cell suspension were added to each tube in similar unit volumes (0 25 ml)

Table III shows that the cortisone injections did not suppress the production of hæmolysis in rabbits 2 and 3

The serum of rabbit 1 was selected, and the titrations were repeated with 2% and 10% cortisone-acetate suspension in physiological saline solution as the dilu

No depression of hæmolysis was observed The exp

ment was repeated again, but absorbed and inactive rabbit serum was substituted for the saline diluent before there was no suppression of hæmolysis

It was thought that, though the cortisone might affect the union of antibody with antigen in vi interference might take place at this stage in vivo elucidate this point six guineapigs each weighing at 500 g were given intraperitoneal injections of anti (hæmolytic titre 1 60) The serum was diluted in physiological saline solution and 0 2 ml was adm tered on the first day, 0 35 ml on the second day 0 45 ml on the third Guineapigs 5 and 6 were also g daily intramuscular injections of 0 2 ml of Mer saline suspension of *cortisone acetate (equal to 5 m* cortisone acetate) It was found that the corti did not protect the guineapigs from the effects of hæmolytic sera

The accompanying figure shows the hæmolytic c after injection of hæmolytic antisera Guineapigs 5 *6 received daily injections of cortisone as well*

DISCUSSION

The effects of ACTH in the two cases of acqu hæmolytic anæmia showed considerable differen Case 1 was in a severe hæmolytic crisis when first s

TABLE III—TITRATION OF RABBIT ANTIGUINEAPIG RED SERA

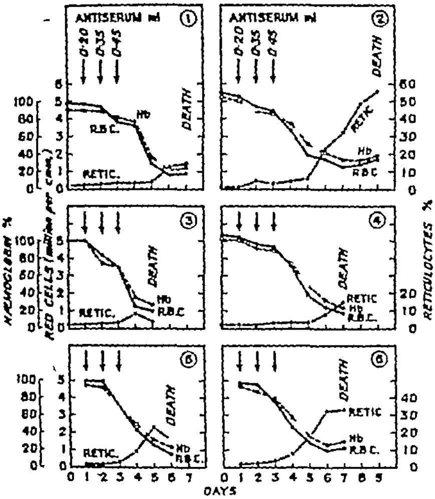
Dilution	1 2	1 4	1 8	1 16	1 32	1 64	1 128	1
Rabbit 1	+3	+3	+3	+3	+3	+3	+2	
Rabbit 2	+3	+3	+3	+3	+3	+2	+1	
Rabbit 3	+3	+3	+3	+3	+3	+3	+2	

Rabbits 2 and 3 received cortisone
+3, complete hæmolysis
+2, partial hæmolysis
+1, slight hæmolysis
± trace of hæmolysis

On administration of ACTH the reticulocyte co jumped from 26 to 51 4% inside twenty four ho but at the same time the serum-bilirubin level steeply The net result was an increase of 10% in hæmoglobin Further treatment did not improve hæmatological picture, but the high reticulocyte serum-bilirubin figures persisted even after the admi *tration of hormone was stopped* What seems to h happened here was that ACTH stimulated the mar with a resultant increase in blood regeneration, but was partly counterbalanced by increased hæmoly The Coombs test remained strongly positive through and the patient when last seen still showed no furt

TABLE II—HÆMATOLOGICAL FINDINGS IN CASE 2 TREATED WITH A C T H.

Date 1951	Hb %	Red cells (million per c mm)	White cells (per c mm.)	Hæma tocrit	Mean corpus cular volume (cμ)	Reticulo cytes %	Eosino phils (per c mm.)	Red-cell fragility (strength of saline solution in which hæmolysis began)	Serum bilirubin (mg per 100 ml.)	Coombs test	Treatmen
April 20	58	2 00	9900	25	122	39		0 74 %	2 0	+1	
April 24	64	2 52	11 000	29	111	32 4		0 74 %	1 8	+2	
May 2	66	2 48	11 600	28	113	35 6		0 74 %	1 2	+1	
May 6	69	2 68	8100	29	108	45		0 74 %		+2	
May 14	67	2 66	13 200	30	113	23 4	400	0 74 %	1 3	+1	
May 15											ACTH 25 6 hourly
May 16	69	2 75	7050	29	104	26	60	0 74 %	0 9	+1	
May 18						18 8					
May 19						18 2					
May 20						25·6					
May 21	80	3 08	9500	38	103	29	120	0 70 %		+1	ACTH discontinu
June 5	95	4 44	7100	39	80	7 4		0 58 %	0 7	+3	



Hæmolytic crises in guineapigs after injection of hæmolytic antisera Guineapigs 5 and 6 received daily injections of cortisone as well

improvement. It is evident that the fundamental abnormality in this case was not abolished

Case 2 differed from case 1 in that the crisis was not so severe and that syphilis was also present. The response to treatment in this patient was remarkably good Since she came under observation three years ago her hæmoglobin had never risen above 70% and she had only been maintained by transfusions. After six days' treatment with A.C.T.H. her hæmoglobin rose from 67 to 89% The rise was not (as in case 1) accompanied by an increase in reticulocytes. Two weeks after cessation of treatment the hæmoglobin was 95% the serum bilirubin level had fallen to 0·7 mg per 100 ml and the erythrocyte fragility was approaching normal but strangely enough the Coombs test was decidedly stronger It seems open to doubt whether the strength of the antiglobulin test is an index of the severity of the hæmolytic process as suggested by Evans and Duane (1949)

If, as is generally accepted now acquired hæmolytic anæmia is caused by sensitisation of the body to its own erythrocytes with the formation of abnormal antibodies, A.C.T.H. must act either by depressing antibody formation, as postulated by Dameshek (1950) or by interfering with the antigen antibody union or some product of their union (Mirick 1951)

De Vries (1950) found A.C.T.H. ineffective in depressing pre-existing antibody levels in rabbits The present experimental work supports this and it was also seen that cortisone did not suppress the antigen-antibody union either in vitro or in vivo

Again, from the clinical material it is evident that on treatment of acquired hæmolytic anæmia with A.C.T.H. the antiglobulin test was if anything more strongly positive indicating that there was no interference with the production of immune bodies or with their attachment to antigenic structures Alternative hypotheses are that A.C.T.H. may depress the activity of the macrophages or possibly stimulate regeneration of the blood as suggested by McKeown (personal communication) and by Rich et al. (1950) who found that it induced splenic hæmopoiesis in rabbits In either case one would expect it to be equally beneficial both in acquired and in congenital hæmolytic anæmias According to Davidson et al (1951) this is not so Thorn (1950) suggests that adrenal steroids inhibit the formation of histamine like substances which are liberated in acute antigen-antibody reactions.

The action of A.C.T.H. varies a good deal according to the state of the adrenal cortex and the term 'acquired hæmolytic anæmia' probably covers a heterogeneous group of diseases It is not surprising therefore to find the effects of the hormone variable in these conditions It seems beyond doubt that some cases of hæmolytic anæmia do benefit from the administration of A.C.T.H., but how this happens is not yet clear

SUMMARY

The effects of A.C.T.H. in experimental hæmolytic anæmia and in two cases of acquired hæmolytic anæmia are reported

One case of acquired hæmolytic anæmia was controlled with A.C.T.H. The other benefited only slightly

Experimental work on rabbits and guineapigs showed that A.C.T.H. does not suppress antibody formation or interfere with the antigen antibody union in vitro or in vivo

I wish to express my gratitude to Prof J H Biggart for his help and criticism of this paper and to the physicians of the Royal Victoria Hospital for their willing coöperation. I am also indebted to Dr M G Nelson for allowing me access to his hæmatological records

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THE HÆMOPOIETIC EFFECT OF VITAMIN B_{12} PREPARED FROM FISH

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CRYSTALLINE vitamin B_{12} prepared from liver extracts and culture broths of streptomyces strains has been shown to possess all the therapeutic properties of the so-called anti pernicious anæmia principle of liver (Ungley 1949 Ungley and Campbell 1951) Four chemically different forms (B_{12} B_{12}b B_{12}c and B_{12}d) exhibiting similar microbiological and hæmopoietic activity have been isolated (Smith 1951)

One of us has previously reported (Hausmann 1949) that cobalt-containing red pigments prepared from undigested cowdung were hæmopoietically inactive when parenterally administered to patients with addisonian pernicious anæmia Only after digestion with hog stomach mucosa or with pancreas enzymes did these substances produce microbiological and clinical effects attributable to vitamin B_{12}. More recently we have suggested (Hausmann and Mulli 1951) the existence of hæmopoietically inactive red pigments in cultures of *Streptomyces griseus* and of bacteria in sheepdung fractions inactive liver extracts and in beef muscle We assumed that our preparations contained vitamin B_{12} peptide conjugates which cannot be utilised in the intermediate metabolism of patients with pernicious anæmia

We describe here the hæmopoietic effect of cobalt-containing red pigments extracted from juice pressed out of fish Such juice having been reported by Peeler et al (1951) to possess high microbiological vitamin-B_{12} activity

MATERIAL AND METHODS

After being gutted, the fish were autoclaved and pressed, and the resulting juice was condensed From this material (called fish solubles) cobalt containing red pigments were extracted by methods similar to those used by Smith and Parker (1949) to obtain vitamin-B_{12} concentrates from ox liver No proteolysis was done

Quantitative cobalt analyses were made by using α-nitroso-β naphthol as the cobalt reagent Microbiological vitamin-B_{12} determinations were performed by the method of Hoffmann et al (1949) using *Lactobacillus leichmannii* 313 as the test bacterium, and alkaline hydrolysis for the destruction of vitamin B_{12} Microbial assays revealed a high vitamin-B_{12} potency of our concentrates No microbiologically active material could be extracted with butanol (Ellis et al 1949) Spectrographic analyses of the butanol extracts exhibited no *absorption spectra of either vitamin* B_{12} or vitamin $B_{12}b$ After the material, with potassium cyanide added (Wijmenga et al 1950), had been left standing for eight days, the red pigments became completely soluble in butanol and yielded the absorption spectra of vitamin B_{12} and showed microbiological vitamin-B_{12} activity Cobalt-containing red pigments both subjected and not subjected to treatment with potassium cyanide were parenterally administered to patients with pernicious anæmia

For clinical tests patients with true addisonian pernicious anæmia were selected No treatment was given for several months before the experiments Reticulocytes were counted daily after staining with brilliant cresyl-blue Red cells and white cells were counted and hæmoglobin estimated (16 g = 100%) twice weekly The bone-marrow was examined repeatedly after aspiration, the smears being stained with May-Grünwald Giemsa stain

The clinical tests with inactive preparations were done in the following way a single dose of the test preparation was injected intramuscularly, if there was no increase in number of the reticulocytes and no improvement in the clinical condition in ten days from the start of the first experiment, a second bone marrow examination was made Unchanged megaloblastic maturation arrest indicated that the test preparation was hæmopoietically inactive in the dosage administered After ten days no further change in the clinical condition or increase in number of the red cells due to the therapy could be expected, and the second experiment was started

CLINICAL TESTS

Case 1 —A man, aged 40, was admitted to hospital because of weakness, anorexia, and loss of weight On physical examination the scleræ were slightly subicteric The tongue was not atrophic There were no signs of subacute combined degeneration of the spinal cord. Hb 60%, red cells 2,500,000 per c mm , white cells 6200 per c.mm Bone marrow megaloblastic Serum iron 180 µg per 100 ml No free hydrochloric acid in the gastric juice after histamine stimulation. X ray examination of the intestinal tract normal

First Experimental Period (fig 1) —Intramuscular injection of cobalt-containing red pigments prepared from fish solubles without KCN treatment The dose would correspond to 120 µg of vitamin B_{12} according to microbiological assays There was no improvement in the clinical condition, and no rise of reticulocytes and red cells The megaloblastic maturation arrest remained unchanged

Second Experimental Period (fig 1) —The patient was given intramuscularly 60 µg of vitamin B_{12} prepared from pancreatin digested cowdung Strength and appetite returned within seven days There was an increase of reticulocytes and red cells The megaloblasts disappeared The marrow remained normoblastic for three weeks

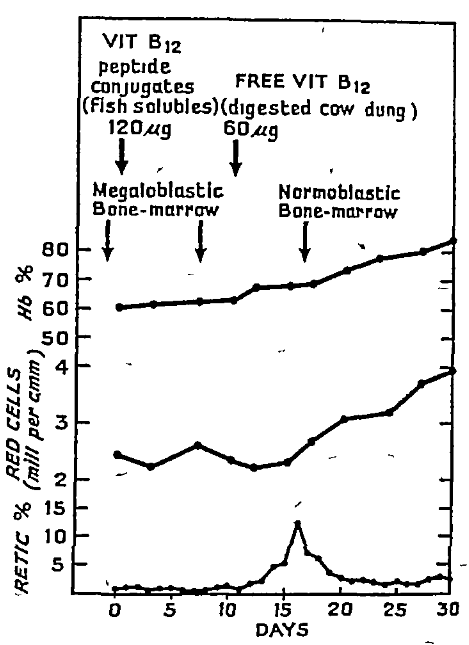

Fig 1—Results in case 1

Case 2—A woman, aged 63, had been treated in 1946
pernicious anæmia with liver extracts for twelve months,
had no further medication She was admitted to hosp
with weakness, anorexia, and paræsthesiæ in feet and har
Her skin and scleræ were lemon yellow Tongue not atropl
Blood pressure 180 mm Hg Traumatic dorsal kyphoscolio
Slight signs of subacute combined degeneration of the spi
cord. Hb 60%, red cells 2,120,000 per c mm , white c
6600 per c mm Serum iron 201 µg per 100 ml Bone marr
megaloblastic Histamine fast achlorhydria X-ray exami
tion of the intestinal tract normal

First Experimental Period (fig 2) —Intramuscular inject
of cobalt-containing red pigments prepared from fish solub
without KCN treatment The dose would be equivalent
120 µg of vitamin B_{12} as microbiologically determined
improvement in the clinical condition. No increase of reti
locytes The bone marrow remained unchanged

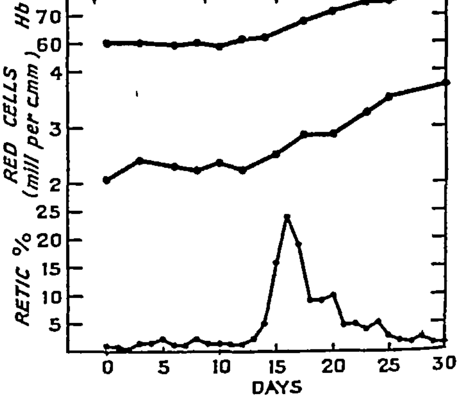

Fig 2—Results in case 2

Second Experimental Period (fig 2) —The patient was given intramuscularly 60 μg of vitamin B_{12} from fish solubles following KCN treatment. Three days later she felt greatly improved the reticulocytes and red cells increased in number and the marrow became normoblastic for more than three weeks. Six weeks after starting effective therapy no signs of subacute combined degeneration of the spinal cord could be detected.

Case 3 —*A* man, aged 66, had been treated for pernicious anæmia with liver extract from 1947 to 1950 For twelve months before admission he had had no treatment He was admitted to the hospital with a month's history of pallor weakness, and fatigue He was well nourished but pale with skin and scleræ subicteric Tongue not atrophic No signs of combined degeneration of the spinal cord Hb 47%, red cells 1,730,000 per c.mm., white cells 6900 per c.mm Bone marrow megaloblastic. Serum iron 103 μg per 100 ml Histamine-fast achlorhydria Radiography of the gastro intestinal tract normal

First Experimental Period (fig 3) —The patient was given intramuscularly cobalt-containing red pigments extracted from fish solubles without KCN treatment The dose would be equivalent to 100 μg of vitamin B_{12} as estimated microbiologically There was no improvement in the clinical condition and *no increase of reticulocytes and red cells* The bone marrow remained megaloblastic

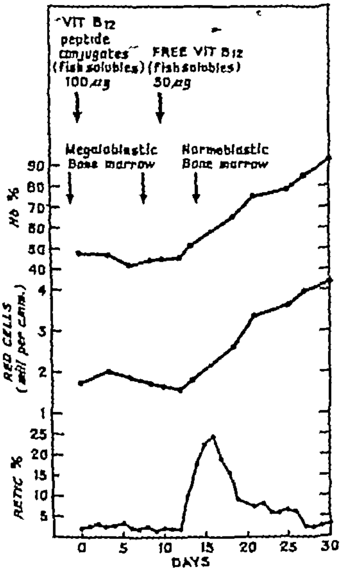

Fig 3—Results in case 3.

Second Experimental Period (fig 3) —50 μg of vitamin B_{12} prepared from fish solubles following KCN treatment was intramuscularly injected There was high reticulocytosis and increase of red cells to normal levels within three weeks The megaloblasts disappeared and the marrow remained normoblastic for more than four weeks.

Case 4.—A man, aged 61 had had liver therapy for pernicious anæmia in 1947–48 The last injection had been given more than two years ago He was admitted to hospital with subicterus and weakness He was well nourished and had lemon yellow skin and subicteric scleræ and his tongue was red and atrophic No signs of subacute combined degeneration of the spinal cord Liver and spleen not enlarged Hb 63% red cells 2,100,000 per c.mm., white cells 6400 per c.mm Serum iron 63 μg per 100 ml *Bone-marrow megaloblastic Histamine* fast achlorhydria. Radiography of the intestinal tract normal

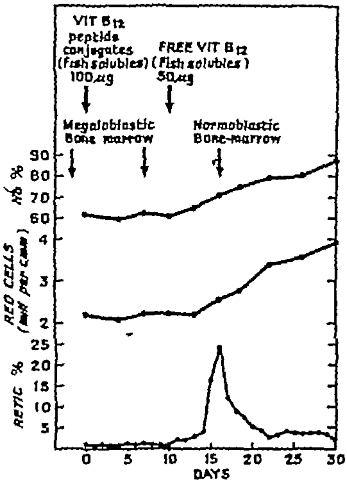

Fig 4—Results in case 4.

First Experimental Period (fig 4) —Cobalt-containing red pigments from fish solubles without KCN treatment were intramuscularly injected in a dose which would be equivalent to 100 μg of vitamin B_{12} as microbiologically determined No change in the clinical condition. No definite rise of reticulocytes and red cells. Megaloblastic maturation arrest of the bone marrow unchanged

Second Experimental Period (fig 4) —Parenteral administration 60 μg of vitamin B_{12} from KCN treated fish solubles was followed by reticulocytosis and rise of red cells to subnormal levels within three weeks The subicterus and glossitis disappeared The marrow became normoblastic for twenty days

RESULTS

Concentrates of high microbiological vitamin B_{12} activity were prepared from fish solubles and parenterally administered to four patients with pernicious anæmia in relapse. The doses were equivalent to 100 and 120 μg of vitamin B_{12} as microbiologically determined *In all four clinical tests there was no improvement in* the clinical condition and no increase in the numbers of reticulocytes and red cells The megaloblastic state of the bone marrow remained unchanged In the subsequent experimental period case 1 responded to a vitamin B_{12} concentrate prepared from pancreatin-digested cowdung Cases 2, 3, and 4 were treated with vitamin B_{12} concentrate prepared from fish solubles treated with potassium cyanide. The doses were equivalent to 50 and 60 μg of vitamin B_{12} according to chemical and microbiological estimates In all three cases there was a rapid improvement in the clinical condition high reticulocytosis and increase in the number of red cells to normal levels within three weeks *The megaloblasts and giant myelocytes of the bone marrow disappeared* The marrow remained normoblastic for more than twenty days

DISCUSSION

Our results indicate that cobalt-containing red pigments prepared from fish solubles without proteolysis or treatment with potassium cyanide could take the place of vitamin B_{12} as a growth factor for *Lactobacillus leichmannii* 313 Parenterally administered to patients with addisonian *pernicious anæmia in relapse our preparations* exhibited no hæmopoietic effect We assume that the red pigments from fish solubles are peptide conjugates of vitamin B_{12} which can be utilised for the growth of certain lactic-acid bacteria but not in the intermediate metabolism of patients with pernicious anæmia This assumption is supported by the following facts (1) after treatment with potassium cyanide the red pigments can be extracted with butanol, and then yield the typical absorption spectra of vitamin B_{12}, and (2) after treatment with potassium cyanide the red pigments develop hæmopoietic activity, as shown in three cases This action of potassium cyanide cannot be explained by transformation of vitamin B_{12}b (hydroxo cobalamin), or vitamin B_{12}c or vitamin B_{12}d into vitamin B_{12} (cyanocobalamin), because all these forms are hæmopoietically as active as vitamin B_{12}

Treatment with potassium cyanide seems to release vitamin B_{12} from peptide linkage This effect is similar to the action of enzymes found in hog stomach mucosa and pancreas extracts which activate in vitro cobalt-containing red pigments prepared from cowdung (Hausmann 1949) Vitamin B_{12} peptide conjugates from fish solubles after digestion with pancreatin for twenty-four hours were not so active as after treatment with potassium cyanide for eight days

Wijmenga et al (1950) report that vitamin B_{12} in certain liver extracts cannot be extracted with butanol before treatment with potassium cyanide They therefore assume that liver extracts might contain vitamin B_{12} peptide conjugates No studies on the hæmopoietic effect of such peptide bound vitamin B_{12} have been published Our own experiments confirm the results of Wijmenga et al (1950) Further, highly refined vitamin-B_{12} peptide conjugates from ox liver produced slight hæmopoietic effect after parenteral administration of 40–90 µg to patients with pernicious anæmia in relapse Treatment with potassium cyanide highly increased their clinical potency Probably our hæmopoietically ineffective cobalt containing red pigments from streptomyces cultures, bacteria cultures, certain sheepdung-fractions, inactive liver extracts, and beef muscle are peptide conjugates of vitamin B_{12} and identical in part with the extrinsic factor of Castle The possibility cannot be excluded that degradation products of vitamin B_{12} might have contributed to their microbiological activity —e g, high levels of cobalt hæmatoporphyrin can take the place of vitamin B_{12} as bacterial growth factor but not as hæmopoietic agent (Hausmann and Mulli 1951)

Peptide conjugates of vitamin B_{12} are not identical with protein-bound forms of free vitamin B_{12} Such vitamin-B_{12} combining potency has been demonstrated in gastric juice (Ternberg and Eakin 1949), human fæces (Pennington 1950), and streptomyces cultures (Smith 1951) The active substance of gastric juice has been named "apo erythein" and assumed to be identical with the intrinsic factor of Castle or part thereof The protein linkage makes vitamin B_{12} unavailable for the nutrition of bacteria, whereas peptide linked vitamin B_{12} can be utilised more or less by micro organisms Heating releases vitamin B_{12} from apo erythein linkage but not from peptide conjugates Apo erythein can combine with peptide conjugates of vitamin B_{12} Several questions arise about the fate of vitamin-B_{12} peptide conjugates in the intestinal tract and intermediate metabolism At present hypotheses of the pathogenesis of pernicious anæmia take account only of the disturbed absorption of vitamin B_{12} It remains to be found out whether there is insufficient liberation of vitamin B_{12} from peptide linkage in the gastric or duodenal juice of patients with pernicious anæmia Crystalline vitamin B_{12} and peptide conjugates from liver are effective in the treatment of radiation sickness in man when daily doses of 30 µg are given parenterally or orally (Renner 1951, J Dahlmann and K Hausmann, unpublished) Preparations from fish solubles containing hæmopoietically inactive red pigments have been effective when given by mouth, but not parenterally, in the treatment of radiation sickness in a few cases (Dahlmann and Hausmann) More experience is necessary before we can say that not all the peptide conjugates of vitamin B_{12} can be utilised in the intermediate metabolism of persons without macrocytic anæmia

The present results should be considered in manufacturing preparations for the treatment of pernicious anæmia and especially in comparing the hæmopoietic effects of liver extracts and vitamin B_{12} By microbiological assays alone hæmopoietically active vitamin B_{12} cannot be differentiated from less potent peptide conjugates Determination of the relation of free vitamin B_{12} to conjugates, by chromatography and chemical analysis, will probably prove important

SUMMARY

Cobalt containing red pigments with high microbiological vitamin-B_{12} activity were prepared from fish solubles When they were administered in parenteral doses equivalent to 100 and 120 µg of vitamin B_{12}, no hæmopoietic effect was induced in four cases of pernicious anæmia in relapse

After being treated with potassium cyanide for eight days the red pigments became completely soluble in butanol and yielded the absorption spectra of vitamin B_{12}

The administration of 50 and 60 µg of vitamin B_{12} from this preparation produced excellent clinical response

It is concluded that the hæmopoietically inactive red pigments are peptide conjugates of vitamin B_{12} which can be utilised for the growth of lactic-acid bacteria but not in the intermediate metabolism of patients with pernicious anæmia, and that treatment with potassium cyanide releases vitamin B_{12} from peptide linkage.

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HÆMOTHORAX FOLLOWING ARTIFICIAL-PNEUMOTHORAX REFILLS

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HÆMORRHAGE into the pleural cavity after an artificial pneumothorax refill, although rarely fatal, may be followed, in the absence of adequate treatment, by certain undesirable complications, such as early obliteration of the pneumothorax space and impairment of respiratory function resulting from thickened pleura

The following cases, in which intrapleural bleeding took place after pneumothorax refills, are thought to be of additional interest in view of the fact that two patients were undergoing bilateral collapse treatment at the time of the accident, while the third had a right-sided thoracoplasty as well as a left-sided artificial pneumothorax

CASE-RECORDS

Case 1 —A girl, aged 19, was admitted to the sanatorium on Aug 23, 1948, with bilateral pulmonary tuberculosis involving both upper zones Cavitation was present on both sides and tubercle bacilli were isolated from the sputum. A left-sided artificial pneumothorax was induced on Sept. 10 followed by division of adhesions on Dec. [illegible]. The right lung was collapsed on Jan. 28, 1949, and adhesions were divided in two stages on March 1 and April 26. Progress was satisfactory, and the patient left the sanatorium on June 10. Thereafter she attended the chest clinic for weekly refills.

On March 24, 1950, after having had refills on both sides the patient experienced a feeling of tension in the left side of the chest followed by increasing shortness of breath. On the night of March 26 she was unable to sleep because of dyspnoea. Next morning she reported her symptoms to the clinic and was later conveyed there by ambulance. Fluoroscopy revealed a pleural effusion, which on aspiration proved to be a hæmothorax. The patient was admitted to the sanatorium the same morning.

On admission her general condition was good and there was only moderate dyspnoea. Radiography showed a left-sided pleural effusion reaching the level of the anterior end of the third rib. In the anterolateral part of the third left interspace there was an opacity invisible on previous films which may have indicated a fibrin deposit at the site of the bleeding-point.

Aspiration shortly after admission yielded 30 oz. of heavily bloodstained fluid, and screening then showed only a little residual fluid. A second aspiration done on March 31 produced 8 oz. of bloodstained fluid. Post-aspiration fluoroscopy showed an almost dry pleural space. Refills were given on both sides after the aspiration. The patient was finally discharged on April 21, 1950, and fifteen months later both pneumothoraces were reported as satisfactory.

Case 2.—A man, aged 30, was admitted to the sanatorium on Dec. 14, 1949, with bilateral pulmonary tuberculosis involving the right upper and middle and left middle zones; cavitation was present in the right upper lobe and the apical segment of the left lower lobe. Tubercle bacilli were found on direct smear examination. Treatment with streptomycin 1 g. daily was begun on the day of admission, and on Feb. 14 a right phrenic crush was performed, followed by the induction of a pneumoperitoneum on Feb. 23. At the end of three months' streptomycin treatment sensitivity tests showed that the tubercle bacilli had become highly resistant. The patient developed severe pyrexial reactions after twelve days' treatment with *p*-aminosalicylic acid (P.A.S.) 20 g. daily. Later desensitisation was successfully accomplished, and eventually he was able to tolerate P.A.S. 18 g. daily. The pneumoperitoneum was discontinued at the end of March, 1950, and a right-sided artificial pneumothorax was induced on April 12. A good concentric collapse was obtained and no adhesions were visible on the X-ray film. Thioparamizone 150 mg. daily was given from July 7 until the date of discharge. On Sept. 6, 1950, the left lung was collapsed.

For several months progress was unsatisfactory; the sputum remained positive and tomograms showed a patent cavity in the right upper lobe. However, by the end of February, 1951, the sputum had become negative on culture and the cavity in the right lung closed.

Since the induction of the right artificial pneumothorax the patient had been having twice-weekly refills on that side, the site of puncture being the fourth interspace in the axillary region. On April 17, 1951, after having had refills on both sides the previous day, he complained of more dyspnoea than usual and later experienced pain over the lower ribs on the left side. Fluoroscopy revealed a right-sided pleural effusion, with its level at the anterior end of the fifth rib. Aspiration produced 28 oz. of heavily bloodstained fluid. A second aspiration was done three days later when 3 oz. of bloodstained fluid was removed, and screening then showed only a little residual fluid. Normal refills on both sides were given from now onwards, and the patient was discharged on May 24, no further aspirations being found necessary. Seven weeks later both pneumothoraces were being maintained without difficulty and there was no evidence of any obliterative process.

Case 3.—A woman, aged 27, had undergone right-sided oracoplasty for an upper-lobe cavity in November, 1946; vision thoracoplasty in June, 1947; and induction of a ft-sided artificial pneumothorax in November, 1947, for a ion in the left middle zone. No adhesions were seen at oracoscopy. After discharge from the sanatorium in May, 48 the patient attended the chest clinic for refills.

At a refill on March 27, 1951, when the needle was introduced into the pleural cavity at the site of previous refills in the anterior axillary region, bleeding was encountered and the needle was withdrawn. It was reinserted through the same interspace, after which the refill proceeded normally. Screening after the refill showed a trace of fluid in the left pleural cavity. The patient attended the clinic again on March 29, when she said she felt reasonably well. An X-ray film showed an increase in the amount of the fluid, which now reached a level about an inch above the left hemidiaphragm. Next morning she notified the clinic that she had passed a very restless night because of severe dyspnoea. She was conveyed by ambulance to the clinic later in the morning, and radiography showed a considerable increase in the size of the effusion, which now reached the level of the anterior end of the fourth rib. Aspiration produced about 12 oz. of heavily bloodstained fluid, after which the patient complained of faintness and the needle was withdrawn. She was admitted to sanatorium the same afternoon.

On admission the patient was cyanosed and acutely dyspnoeic. Radiography shortly after admission revealed gross displacement of the heart and mediastinum towards the right and a left-sided pleural effusion with its level at the anterior end of the third rib. The whole of the left lung was obscured by the fluid. Aspiration was performed at once, but difficulty was encountered owing to blocking of the needle, and only 10 oz. of heavily bloodstained fluid was obtained. The dyspnoea was partially relieved after 600 ml. of air had been taken off with the pneumothorax apparatus.

Next morning the patient's condition was poor. She was again acutely dyspnoeic and cyanosed, and it was therefore decided to attempt to evacuate the hæmothorax through a thoracoscopy cannula. In view of the duration of the pneumothorax, the fact that the left lung appeared to be healed, and the permanent collapse of the right lung, it seemed desirable to encourage re-expansion of the left lung rather than to aim at preservation of the pneumothorax.

Left thoracoscopy was done by Mr. Ian Hill on March 30 under local anæsthesia. An axillary cannula was introduced and a quantity of heavily bloodstained fluid was expelled on coughing. A further quantity was withdrawn by suction, bringing the total volume up to about 2 pints. Inspection of the pleural cavity showed the origin of the hæmorrhage to be a lateral division of the internal mammary artery. By this time, however, bleeding had ceased. Oxygen was administered throughout the operation.

On postoperative screening the lung was seen to be collapsed and there remained a small effusion with its level just below the diaphragm. As much air as possible was withdrawn through a pneumothorax needle, after which screening showed satisfactory re-expansion of the lung. From now onwards the patient's condition improved rapidly. Within the next seven days two further aspirations removed 23 oz. of bloodstained fluid from the pleural cavity. During this period there was a moderate degree of pyrexia, reaching a maximum of 100·2°F on the fourth evening after operation. The patient was discharged on May 7, when radiography showed only a small hydropneumothorax remaining, with the lower margin of the fluid at the level of the anterior end of the first rib. Ten weeks later X-ray films showed complete re-expansion of the left lung, and the patient's condition was stated to be satisfactory.

DISCUSSION

Incidence

Hæmorrhage into the pleural cavity after pneumothorax refills is a comparatively rare complication. Miller and Rinkel (1947) reported 7 cases in 18,000 refills and Harold (1951) 6 cases in 180,000 refills given at the Brompton Hospital between 1939 and 1949. The latter series, however, includes only those patients in whom not less than 20 oz. of heavily bloodstained fluid was obtained at aspiration.

I have encountered 1 case of intrapleural bleeding following a pneumothorax refill (case 2) in 10,600 refills done at the Bedfordshire Sanatorium during the last five and a half years.

Probably the incidence of this complication is much greater than published figures suggest, since the apparently insignificant collections of pleural fluid which are often observed during routine fluoroscopy of patients undergoing artificial-pneumothorax treatment may be due to intrapleural hæmorrhage There is also the possibility that the obliterative pleurisy which curtails the duration of many pneumothoraces may have its origin in a small intrapleural collection of blood

Ætiology

Probably the commonest cause of hæmothorax following an artificial-pneumothorax refill is trauma to a lateral branch of the internal mammary artery These vessels, which have been described by Cleland (1948), are visible in a large proportion of patients submitted to thoracoscopy, they are seen coursing over the inner surface of the upper and anterolateral aspects of the chest wall, an area which is often selected for the insertion of pneumothorax needles Some surgeons are particularly careful to avoid injuring the vessels when introducing the axillary cannula during thoracoscopy It is not surprising that these branches of the internal mammary artery occasionally suffer damage during the insertion of a pneumothorax needle The suggestion has been made that the risk is greater when a relatively sharp needle is used, since *presumably a blunter one would tend to* displace the vessel rather than to pierce it

Other less common causes of intrapleural hæmorrhage after artificial-pneumothorax refills are rupture of adhesions and injury to intercostal and intrapulmonary vessels

Treatment

Barrett (1945) has pointed out that some clotting takes place in every case of hæmothorax, and that blood in the pleural cavity acts as a foreign body, leading to the production of a reactionary effusion Failure to remove this effusion is likely to lead to the early deposition of fibrin on the pleura, with consequent impairment of respiratory function Sellors (1951) describes the process as one of defibrination, with a reactionary fibrinous exudate, leading in untreated cases to a secondary fibrin clot

In most hæmothoraces the bloodstained fluid can be removed by simple aspiration, but where difficulty is encountered through the needle becoming blocked evacuation through a thoracoscopy cannula often gives satisfactory results This method has the additional advantage, where bleeding is still in progress, of permitting inspection of the pleural cavity and the application of the cautery, or pressure, to the bleeding-point when visible

Thoracotomy may be necessary, when other methods have failed, but this is not recommended in the absence of serious and continued hæmorrhage, since experience has shown that after thoracotomy the chances of preserving a pneumothorax are poor

Where clots prevent evacuation of a hæmothorax the intrapleural injection of streptokinase, a liquefying enzyme, followed by aspiration (Tillett et al 1950, Gauld and Harold 1950) has given encouraging results

SUMMARY

Three cases of hæmothorax following artificial-pneumothorax refills are described In two cases the pneumothorax was preserved, in the third, where early re-expansion of the lung was considered desirable, this was achieved

The incidence, ætiology, and treatment of this complication are discussed

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GROSS AMINO-ACIDURIA FOLLOWING A LYSOL BURN

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A SEVERE 'Lysol' burn is reported, with neurological disturbances and uræmia The case is noteworthy for the gross amino aciduria and glycosuria which occurred in the early diuretic phase of recovery This was associated with other signs of renal tubular damage, including a strongly negative balance for water, sodium, potassium, and chloride Except in poisoning with heavy metals such as uranium (Voegtlin and Hodge 1949), amino aciduria has not previously been described in the toxi nephroses, although it is now a well recognised featur of certain chronic renal tubular defects (Dent 1951) Amino acid chromatography in cases of acute rena lesions, especially those following poisoning with inorgani mercury, lead, chromium, arsenic, and other heav metals (MacNider 1924), may show that it is no uncommon

CASE RECORD

A laboratory assistant, aged 58, was admitted to Universit College Hospital under the care of Prof M L Rosenheim o June 6, 1951 Two days previously a bottle of concentrate lysol broke in his trouser pocket, and by the time he reache home, less than twenty minutes later, he was in a confuse state and soon became comatose His doctor found an treated an extensive lysol burn on the left thigh, and admitte him to another hospital The burn was washed with alcoho Systemic penicillin and a continuous intravenous drip c saline solution and sodium bicarbonate were given in the nex forty eight hours During this time the patient remained i a stupor and passed only 10 oz of dark greenish-brown urin characteristic of carboluria He had a small bloodstaine vomit

On admission to University College Hospital his temperatur was 98°F, pulse rate 50, pulse regular, and blood pressur 150/90 mm Hg There was 1 in of venous congestion in th neck, with basal râles and slight sacral œdema The live was tender and palpable 1 in below the costal margi Electrocardiography showed sinus tachycardia and lov voltage curves The patient was comatose, with pupils smal all tendon reflexes brisk, and plantar responses extensor Ther was generalised twitching, with strongly positive signs o Trousseau and Chvostek. On the left thigh and buttoc there was a second degree burn measuring about 20 × 6 in (fig 1)

Both kidneys were tender 10 oz of dark urine had bee obtained by catheter in the previous forty eight hours, i contained 7 parts per 1000 of albumin and numerous red an white blood cells Subsequent tests on the urine distillat gave positive ferric chloride and bromine tests for phenols

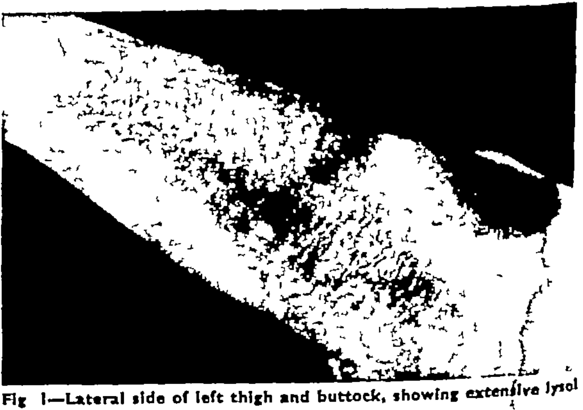

Fig 1—Lateral side of left thigh and buttock, showing extensive lysol burn

Urine chromatography detected hydroquinone, glucuronides, glucose and amino acids. The blood urea level was 124 mg per 100 ml The plasma contained sodium 140 m.eq., chloride 100 m.eq potassium 5 2 m.eq ; and HCO₃ 36 m.eq., per litre

The neurological disturbances and the anuria were considered to be caused by the absorption of phenols through the skin. The case was complicated by alkalosis tetany and overhydration.

Treatment —To minimise cellular katabolism and to reduce the œdema, the patient was fed by a continuous intragastric drip of an oil water glucose emulsion which provided 2500 calories a day, 800 ml of water and no electrolytes. Vitamin supplements were added. Vomits were filtered and returned through the tube Calcium gluconate injections relieved the tetany On the advice of Mr D N Matthews the burn was left exposed Cultures from it grew organisms sensitive to chloramphenicol and, because of the anuria, high plasma-chloramphenicol levels (over 60 µg per ml.) were obtained after the small oral dose of 250 mg b d

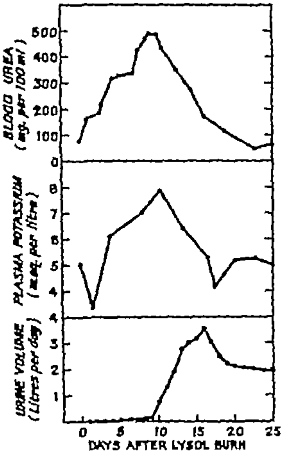

Fig. 2—Development of uræmia following lysol burn. After ten days almost complete anuria there was profound diuresis and rapid recovery from uræmia. In this early diuretic phase of recovery there was gross amino-aciduria (fig 4)

Progress —The patient's general condition soon improved the tetany disappearing in twelve hours and the venous pressure returning to normal in two days. For ten days no urine was passed and only 10–80 ml could be obtained on daily catheterisation The blood-urea and plasma potassium levels rose rapidly reaching levels of 474 mg of urea per 100 ml and 7 2 m eq of potassium per litre after ten days (fig 2) The rates of increase were greater than is usually found in anuric patients on this régime (Nabarro and Spencer 1951)

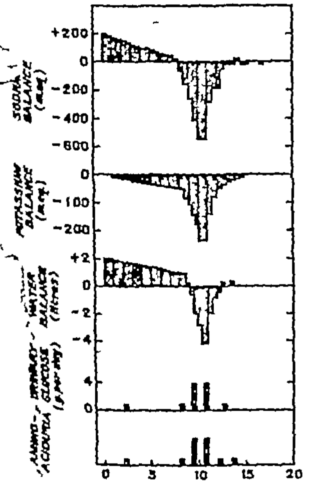

Fig 3—Cumulative balances of sodium potassium, and water showing gross negative balances in first three days diuresis during recovery from anuria due to lysol burn. At this time there were glycosuria and gross amino-aciduria (see fig 4)

This was attributed to the katabolic response known to be associated with severe burns (Selye 1940) Diuresis began after ten days and soon increased to a maximum of 3400 ml. a day For three days the patient was grossly in negative balance for water (−6 litres) sodium (−498 m.eq) and potassium (−240 m.eq) (fig 3) Plasma-electrolyte levels fell rapidly and it became necessary to supplement the intake with additional water sodium potassium, and chloride The blood urea level fell to normal values in twelve days (fig 2)

The patient was soon eating a high protein diet and undergoing active physiotherapy The burn gradually epithelised from the periphery leaving a supple non adherent scar The changes in renal function measured by clinical tests may be summarised as follows :

Days after burn	0	5	10	15	20	90
Albuminuria p p 1000	12	8	6	1	0	0
Red cells	+ + + +	+ +	+ +	+	0	0
White cells	+	+	+ +	+ +	+	0
Casts	0	0	0	0	0	0
*1 hour urea-clearance (% of normal)	1%	3 ,,	3%	11%	65 ,,	105

This was a standard urea-clearance

DISCUSSION

It is well known that phenols are rapidly absorbed through the skin, producing a local burn and transient neurological phenomena, such as convulsions followed by coma and that in severe cases oliguria and uræmia may supervene A fatal issue may result in a few minutes or may occur later from renal failure Various acute and chronic syndromes have been described (Smith 1948)

The present case is remarkable in that recovery followed a very extensive burn with a concentrated lysol solution During the early diuretic phase of recovery there was evidence of gross tubular dysfunction similar to that which has been described in other toxic nephroses (Bull et al 1950) In addition to the strongly negative balance of water sodium, potassium and chloride there were a very gross amino aciduria (fig 4) glycosuria and

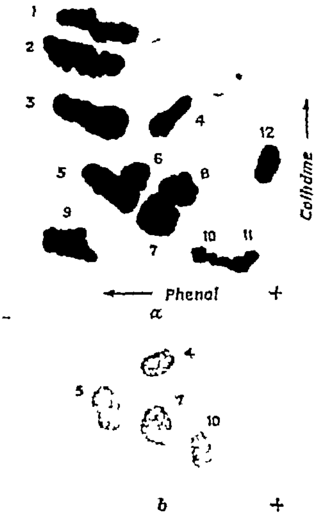

Fig 4—Amino-acid chromatograms of 50 µl of oxidised urine : above gross amino-aciduria in early stage of recovery from lysol poisoning ; below seven days later showing normal pattern and quantity of amino-acid Key : 1 phenyl alanine ; 2, leucine ; 3 valine ; 4 taurine ; 5 alanine ; 6 threonine ; 7 glycine ; 8 serine ; 9 lysine ; 10 glutamic acid ; 11 aspartic acid ; 12, cysteic acid There is some distortion of spots owing to presence of excess of electrolytes

catalase in the urine, although the plasma α amino nitrogen level was not raised The catalase had probably escaped, with other enzymes, from severely damaged renal tubular cells (Voegtlin and Hodge 1949) The urinary chromatograms, as regards amino acids and sugars, became normal after the third day of diuresis

Amino aciduria has been reported to follow experimental uranium poisoning (Voegtlin and Hodge 1949), but no published report has been found of its occurrence in patients with acute renal lesions It is not usually found after therapeutic injections of mercurial diuretics (Spencer, unpublished observations)

METHODS

Electrolyte balances were derived from analysis of the intake and of urine and fæcal outputs (Reifenstein et al 1945) Sodium and potassium were determined by internal standard flame photometry (Spencer 1950), chloride by mercurimetric titration (Asper et al 1947), α-aminonitrogen by the method of Hamilton and Van Slyke (1943), carbon dioxide combining power by Peters and Van Slyke's (1932) gasometric analysis, blood-urea by the method of Van Slyke and Cullen (1916) Amino acid chromatography was done by the method of Dent (1948), sugar chromatography by the methods of Horrocks and Manning (1949) and Chargaff et al (1948)

We wish to thank Miss D Fowler for the amino acid chromatograms, Mr D N Matthews for the local treatment of the burn, and the nurses for their care and attention.

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AGRANULOCYTOSIS DURING TREATMENT WITH DIETHAZINE HYDROCHLORIDE

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Diethazine hydrochloride ('Diparcol') has been widely used in the treatment of Parkinson's syndrome since its introduction by Sigwald et al (1946), and a few isolated cases of agranulocytosis have been reported in patients under this treatment We describe here another such case

CASE-RECORD

A single woman, aged 42, seen in domiciliary consultation by Dr K K Drury and admitted to hospital in May, 1946 She had had postencephalitic parkinsonism for some years, with much rigidity, tremor of hands, fixed immobile features, excessive salivation, and festinant gait

Treatment —Atropine gr $^{1}/_{20}$ (min 5 of liq atrop sulph. *B P C 1934*) t i d, enabled her to walk, with difficulty In view of increasing incapacity, however, a course of diparcol was started on July 15, 1951 The dosage was built up gradually from 0 15 to 0 75 g daily, and atropine was continued in the same dosage as before Objective improvement of tremor and rigidity was noted, but because of slight malaise the dosage was reduced to 0 5 g a day

On Sept 2, six weeks after the start of treatment with diparcol, the patient complained of pain in her right buttock. Inspection showed an indurated and inflamed area, and in view of an accompanying rise in temperature to 101°F she was started on a course of intramuscular penicillin 100,000 units, followed by 50,000 units six-hourly During the next six days an abscess formed and discharged itself spontaneously, and the patient had a slight evening rise in temperature, which subsided on Sept 9 Her general condition was satisfactory throughout this period

On Sept 11, however, her temperature rose sharply and reached 103 2°F in the evening Throughout that night she was restless and she passed four loose motions

On Sept 12 she complained of retrosternal discomfort and slight dysphagia Her temperature had risen to 104 2°F, with respirations 30 per minute She had no cough, but there were crepitations and dullness at the left base Her throat appeared normal The local infection of her buttocks was clearly healing

Blood examination showed 140 white cells per c mm, absence of granulocytes, and only 4 lymphocytes and 1 monocyte after fifteen minutes' search of the film The erythrocyte sedimentation rate (Westergren) 72 mm in 1 hr, Hb 91 3%, red cells 4,300 000 per c mm

Diparcol was immediately discontinued, and the dosage of penicillin, which had been continued since the formation of the abscess, was increased to 200,000 units six hourly

On the evening of Sept 12 a pint of stored cross matched blood was given, after which her temperature fell to 101°F After the blood transfusion the patient's Hb increased from 91 3 to 107 9%, and red cells from 4,300,000 to 4,940,000 per c.mm The white count, however, remained unchanged, varying between 140 and 300 cells per c mm., with a total absence of granulocytes

On Sept 13 the patient received a pint of fresh blood and intravenous pyridoxine 200 mg A sternal puncture revealed in the marrow a total cell count of 9000 per c mm, with an almost complete disappearance of all granulocytes and red-cell precursors in the smear, thus indicating an aplasia and not a maturation defect

On Sept 14, intravenous pyridoxine 200 mg was again given, but the patient s condition continued to deteriorate rapidly, with the temperature swinging between 101° and 103°F Her throat was still unaffected, she had had no further diarrhœa since the night of Sept 12, and apart from the chest signs there were no other local signs On Sept 15 she died in terminal hyperpyrexia.

Post mortem Findings —Necropsy confirmed the absence of an agranulocytic angina and apart from a shallow acute ulcer of the stomach the œsophagus and intestinal tract were free from macroscopic pathological change The lower lobe of the left lung showed consolidation, and there was a small effusion in the left pleural sac The only other pathological changes found were the healed abscess and several recent punctate hæmorrhages throughout the white brain matter in the neighbourhood of the basal ganglia

DISCUSSION

Two cases of fatal agranulocytosis and two cases of non fatal granulocytopenia in patients receiving diethazine hydrochloride have previously been published

Sigwald et al (1917), reviewing 168 cases treated with this drug, reported a fatal case in a woman aged 60 Six weeks after the start of treatment she developed a sudden agranulocytic angina with a leucopenia and total granulocytopenia These workers did not consider diethazine primarily responsible The dosage in this case reached 1 5 g daily

Meek (1949) reported a fatal case of agranulocytic angina in a woman aged 58 She died three weeks after the full dosage of 1 g daily had been reached There was leucopenia, and only 4% granulocytes were found in a white-cell count

The two cases of non-fatal granulocytopenia mentioned were described by Albahary and Caldera (1950) and Van der Minne (1950) In the former case there was transitory disappearance of granulocytes from the bone marrow and a sudden leukæmic reaction eleven days later followed by rapid and spontaneous recovery. Van der Minne's case was in a woman aged 64 who developed granulocytopenia and pyrexia after a month's treatment. There was a decrease in the number of total white cells to 2300 per c mm. When diparcol was withheld and penicillin therapy instituted the white cell count returned to normal after a week.

Careful blood records have been kept in the past but with few untoward findings. Sigwald et al (1947) found no decrease in granulocytes in repeated white-cell counts in 24 patients treated with diethazine. Duff (1949) found a tendency for white cells to decrease to 4000 per c.mm during the initial week's treatment and to increase subsequently to former blood levels. Bovet et al (1947) have also studied the effect of diethazine on white-cell counts in rats whose blood is particularly sensitive to chemotherapy. Daily injections for a month produced no changes in the blood pictures.

In the present case the only drugs administered were diethazine hydrochloride, penicillin and atropine. The latter two can be discounted as causal factors, and this seems to leave three possible explanations of the illness. The agranulocytosis may have been idiopathic or due to the toxic effects of an overwhelming infection or due to the administration of diethazine. We favour the last explanation.

We feel that the agranulocytosis was responsible for the initial local inflammation and that the penicillin therapy thereafter masked the further progress of the disease. It is unfortunate that a white-cell count was not made earlier and it is interesting that signs of necrotic angina were absent throughout the illness and that our dosage was lower (0 75 g daily) than that used in the other fatal cases.

In conclusion we submit that there is sufficient evidence for regarding diethazine hydrochloride as a potential though probably infrequent cause of agranulocytosis.

We wish to thank Dr K. K. Drury for kindly permitting us to publish and Dr R McD Cairns, Dr A. B Monro and Dr E M Ward for their advice. The makers of diparcol have been most helpful.

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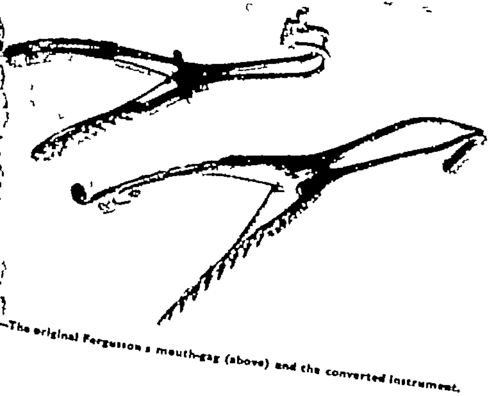
New Inventions

A BLADDER-NECK SPREADER

THE bladder neck spreader designed for use in the retropubic type of prostatectomy has certain disadvantages which are probably more apparent to the assistant than to the surgeon himself. Firstly the leverage is inefficient, because the fulcrum of the cross action is at the opposite end of the instrument to the retracting blades. Secondly the hand-grip is uncomfortable so the assistant's left hand tires quickly and consequently he does not maintain a satisfactory exposure of the bladder neck and prostatic cavity. Thirdly the blades are flat and smooth and tend to ride out of the bladder neck.

The new spreader described here has been designed to overcome these disadvantages. The fulcrum is at the centre of the instrument thus improving the leverage. A block is incorporated in the handles to avoid over-stretching the bladder neck. This stop allows 1¼ in separation of the blades which should be sufficient to give adequate exposure in all cases. The handles are broader and do not cut into the fingers and the grip is shaped to ensure comfort and steady retraction. The blades are cross-grained on their outer surface and have a smooth lip at the end to retain them in the bladder neck. When the blades are allowed to close the tips approximate accurately permitting easy introduction into the bladder neck.



—The original Fergusson's mouth-gag (above) and the converted instrument.

It was found that a Fergusson's mouth gag could be readily converted by a skilled instrument technician to produce exactly what was required. Fig 1 illustrates the original mouth gag above the converted instrument. It will be seen that the following alterations are necessary.

(1) The self retaining ring round the handle shafts is removed and the fulcrum screw may need filing down.

(2) Blocks are fitted at the fulcrum to arrest the handles with 1¾ in. inside measurement between their ends.

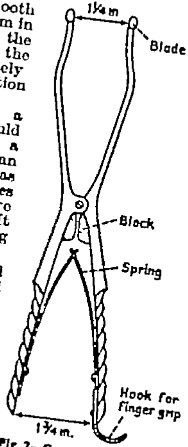


Fig 2—Converted instrument with handles compressed and blades separated

(3) The shafts of the blades are bent back into the curve shown in fig 1. When the handles are closed the maximum separation of the blades should be 1¼ in inside measurement (fig 2).

(4) Longer blades are then brazed on to the existing blades to give the lip at the end and the necessary increase in length (fig 3).

(5) A retraction hook is fitted to the end of the handle gripped by the fingers.

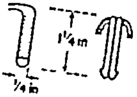


Fig. 3—Side and end on views of blades.

I wish to thank Mr A F Christmas F.I.S.T instrument technician to the United Bristol Hospitals for his help and skill in converting the prototype of this instrument.

United Bristol Hospitals

J P MITCHELL,
F.R.C.S

Reviews of Books

Global Epidemiology

A Geography of Disease and Sanitation Vol II Africa and the Adjacent Islands Brigadier General J S SIMMONS, dean and professor of public health, Harvard University, and others Philadelphia and London J B Lippincott 1951 Pp 652 £6

APPEARING seven years after the first volume, which dealt with India, the Far East, and the Pacific area, this second volume covers the whole of Africa and the adjacent islands

The basis of the work is the information collected by the preventive medicine service of the Office of the Surgeon-General of the United States Army, for practical application to the health problems of American troops wherever they might be sent In the number and distinction of its authors and collaborators, its exhaustive and factual character, and its extensive bibliographies and lavish maps, it is something which perhaps could only have been achieved in the United States

For each of the political territories (grouped into eight geographical regions) an epitome is given of the geography and climate, population and socio-economic conditions, environment and sanitation (including fauna and flora of medical importance), health services and medical facilities, and diseases, according to mode of spread At the end are maps showing the distribution of the principal tropical diseases and an excellent appendix on health hints for the tropics The basic material was supplemented and brought up to date by visits of one of the authors to most of the territories concerned and to the metropolitan headquarters of each of the colonial medical services

Perhaps the main title—global epidemiology—is a trifle misleading, since the approach is not that of the older writers on this subject Hirsch, for example, would never have dreamt of including "health services and medical facilities" in his *Handbook of Geographical and Historical Pathology* What has been produced is rather a working reference book of the actual health conditions in various parts of Africa A grant from the U S Public Health Service to the school of public health of the University of Minnesota has made possible the completion of the second volume, and further volumes covering the remaining areas are promised. If only there was a likelihood of a similar series for the Russian areas, we would now be in sight of a modern atlas of health and disease for the whole world

Actualités hématologiques

Editor J P GLAUNÈS Paris Doin 1951 Pp 213 Fr 1150

THIS "recent advances in hæmatology" contains five essays by different authors on hæmatological subjects.

P Cazal (Montpellier) gives a complete but conventional account of hæmatological laboratory techniques that reflects the Continental love of "indices."

H Dubois-Ferrière (Geneva) deals fairly with the five different explanations of the origin of the plasma cell, and comes down in favour of the dual derivation from either lymphocytes or histiocytes He reviews the evidence for the connection of plasma cells with abnormal proteins, and he supports the view that plasma cells absorb foreign proteins and then return them to the circulation as immune bodies fixed to globulin There is a very full list of references about this topical subject

A Gambigliani Zoccoli (Turin), writing on Banti's syndrome, thinks that the evidence still favours a progressive "fibrotic mesenchymopathy" and is not impressed by the American hypotheses of portal hypertension, especially in cases of so called intrahepatic block.

The editor and H Drieux (Paris) write about the reticuloses in domestic animals, which are quite as diverse as in man, and whose study, they think, will provide useful information about obscure points in human pathology

Finally L Revol (Lyon) contributes an essay on the hæmorrhagic diseases caused by variations in the blood platelets He points out, with justice, that there are too many eponymous syndromes based on minor variations or individual interpretation of laboratory tests He holds that only two things need be considered about platelets—their number and their morphology Variations of these all fit into the group of "constitutional thrombocytopathies" Morphological variations of platelets have been little studied in this country, and it is interesting to see the form that Revol regards as pathological The treatment for all forms of Revol's syndrome is splenectomy, which he argues is not really curative but represents a measure of "urgent salvage" that improves the patient's condition.

Apart from the first, all these contributions represent a viewpoint different from the usual, and so are worth perusal.

History of Medicine in Ireland

JOHN FLEETWOOD, M B, D.P H Dublin Browne & Nolan 1951 Pp 380 21*s*

THE rise and development of medicine and surgery in Ireland has been practically coexistent with the civilisation of that country—a country in which, history indicates, pity for the poor and ailing has ever held a foremost place The association of the Church with medicine and surgery in the granting of licences to practise physic and surgery is an interesting point in the early Christian era. Dr Fleetwood notes the slow and hesitating steps of progress at this time when folk lore and superstition prevailed, it was not until the 15th century that medicine and surgery were released from this bondage In 1492 the College of Medicine and Surgery was founded, and from that time onwards medicine in Ireland marched with that of this country Among the great names in this progress those of the distinguished Quain family and Whitla stand out pre-eminently The book gives an authentic and scholarly account of all this It is well documented and profusely illustrated

Marriage

KENNETH WALKER, F R.C S London Secker 1951 *Pp 136 8s 6d*

THERE are not many short books on sex hygien to equal this straightforward discussion of marriage Brief, lucid, sensible, and devoid of personal bias, it wil be useful to doctor and layman It is not occupied with physiology to the exclusion of social and psychologica forces, but its physiological descriptions are explici and its discussion of social issues responsible withou being moralistic To give due weight to a point of view and yet avoid a *parti pris* approach is difficult in thi branch of hygiene teaching, but Mr Walker has achieve it. In spite of the overgrowth of sex literature, his boo is both justified and welcome

Psychotherapie als Kurzbehandlung in der Sprechstunde (Munich J F Lehmann 1951 Pp 113 D.M. 9 50) —Dr Johannes Cremerius conducts an advisory centre in Munich for patients with psychosomatic disorders His book describes the methods of psychotherapy he finds useful they are comparatively simple and familiar The book contains nothing new, except a brief reference to the Wartegg test as a diagnostic aid

British Encyclopædia of Medical Practice (2nd ed London Butterworth Medical Publications 1951 Vol. 8 Pp 628 65*s*) —This volume is labelled "Latah and amok to Motor neurone" and the way between the two leads, for example, through leprosy and leukæmia to measles and migraine There are over 50 articles, of which 10 are on diseases of the lung One volume follows so hard upon the other that the final publication will soon appear—a great achievement by Lord Horder and his assistant editors.

Plastics Progress (London Iliffe & Sons 1951 *Pp* 310 50*s*) —This handsomely produced volume, edited by Mr Philip Morgan, comprises the papers and discussions at the British Plastics Convention, 1951, in which the authorities in the various branches of the plastic industry in this country took part—designer, producer, and consumer Much of it is of general interest in an age when plastics are being used so freely, but little of it is of practical interest to the doctor Less than 20 pages are allotted to the employment of plastics in medicine, and at least some of this seems intended for the lay reader It is unlikely that the medical man interested in plastics will meet anything here which he has not already read elsewhere in greater detail

THE LANCET

LONDON SATURDAY, JANUARY 26 1952

Support from Scotland

MANY well-intentioned metaphors have been heaped on the general practitioner. In his time he has found himself the backbone, the mainstay, and the Cinderella of his profession. He has also been described, more accurately, as an indispensable instrument of national health policy. But, like other keen instruments that are in constant use yet are not properly cherished, he is in danger of having his cutting edge blunted; and unhappily there are far too many practitioners who have reason to be discontented with their present lot and despondent about its improvement. One of the chief reasons for this discontent and despondency is the way in which so many of them have been pushed out of hospital work. Like other people, we have repeatedly pointed out that the immediate advantages of giving a general practitioner's beds to a specialist can be bought too dearly if the cost is permanent depression of the morale of that practitioner and his colleagues; and the Ministry of Health has issued admirable circulars to regional boards bidding them remember the family doctor's needs. But the basic difficulty is that the authorities which own hospital beds are primarily interested in hospital services and therefore cannot be expected to worry very much about the remote effect of their decisions on standards of general practice. Hence we have continuing complaints like last week's report from Leeds expressing resentment at the "progressive exclusion of G.P.s from cottage hospitals and the virtual abolition of general practitioner consultants."[1] And these complaints now have formal backing in the long-awaited report on the General Practitioner and the Hospital Service,[2] from a subcommittee of the Scottish Health Services Council. This Scottish committee believe that the "essential task of the general practitioner is the constant care of his patients in all the vicissitudes of family and community life; he must be much more than an agent to select patients for the nearest outpatient department or hospital, his own responsibility limited to the treatment of minor ailments." The shift of emphasis in medical care from the family doctor to the specialist began after the first world war and was perhaps an inevitable result of medical progress. But it has been accentuated and hastened by the introduction of the National Health Service, and the committee feel that the time has come when the requirements of these two branches of the profession must be reconsidered. "A long-term view must be taken, and a change of heart may sometimes be needed."

Throughout their report they sharply distinguish between patients who go to hospital for medical and for non-medical reasons. Normal confinements and uncomplicated illness which for domestic reasons must be cared for in hospital should remain, they hold, in the charge of the family doctor. Thus in these times of overcrowding, shortage of domestic help, and lack of home nursing the practitioner needs more beds rather than fewer. Yet the expansion of the specialist services—and the committee readily admit it was necessary in many areas—has sometimes been achieved at his expense. They are particularly disturbed at his being cut off from much of his maternity work. "If the present tendency to restrict the practitioner's part in institutional midwifery is not reversed," they say, "there will undoubtedly be a decline in the standard of domiciliary midwifery. Unless the balance is redressed there is in fact a serious danger that midwifery will cease to be a basic part of general practice." Cottage hospitals, in their view, should be jealously guarded as general-practitioner hospitals, especially as the larger general hospitals offer little scope for the provision of practitioners' beds. But cottage hospitals, like cottages, belong to the country; and the question is what should be done to provide similarly for the doctors in towns. With present restrictions on building the committee recognise that to think of providing new beds is rather like planning hospitals in Spain; but when the situation improves they would like to see created, for town practitioners, wards, blocks, or even hospitals, each attached to a large general hospital. This suggestion is reminiscent of the secondary hospital staffed by registrars lately proposed by Mr SANGSTER SIMMONDS.[3] But at the general-practitioner hospital, as seen by the Scottish committee, the general practitioner himself would be in clinical charge. Though its equipment would be less elaborate than that of the parent hospital, it would offer facilities for minor operations, X-ray work, and routine laboratory tests. The committee admit that care would have to be taken that these units did not become overloaded with chronic cases.

The Scottish committee are also anxious that some general practitioners should have a chance to share in the work of the hospital service as part-time specialists. They want to see the staff of the hospitals reorganised so that it falls into four groups: specialists, specialists in training, general practitioners working as part-time specialists, and house-officers. They insist that general practitioners who share in the specialist work of the hospitals should be fully competent and should do so on terms of equality with their full-time colleagues. They should be effective members of the team and should not be relegated to the dull routine work. Though conditions of service and remuneration were outside their terms of reference, the committee point out that the practitioner will be unable to take advantage of such posts if he is not enabled to limit his work in his practice without loss of income; so he must not be offered an honorary appointment at the hospital but should be adequately paid on a sessional basis They are especially attracted to this system because it would offer a double portal to specialism and would leave open the vexed issue of what is the best training for a consultant Clinical assistantships, refresher courses, ward rounds, and clinical meetings are other links between the doctor and the hospital that might well be reinforced Like Mr SANGSTER SIMMONDS, the Scottish committee suggest that, as a two-way traffic, registrars might act as locums or temporary assistants to the practitioners associated with their hospitals, while the practitioners might begin to take a larger share in undergraduate teaching

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[1] *Brit. med. J.* Jan. 19, 1952, suppl. p. 20.

[2] The members of the joint subcommittee were: Sir Humphrey Broun Lindsay (chairman); Prof. Dugald Baird, F.R.C.O.G.; Prof. D. F. Cappell, F.R.S.E.; Lieut.-Colonel J. C. Dunda; Dr Mary Lockhart; Dr I. D. Grant; Dr G. W. Ireland; Mr A. B. Kerr, F.R.C.S.E.; Dr A. F. Wilkie Millar; Dr E. Neil Reid; Dr W. D. D. Small; Miss Eleanor Stewart; and Dr E. R. C. Walker and Mr R. J. Fraser (joint secretaries). Edinburgh: H.M. Stationery Office. 1952. Pp. 39. 1s. 3d.

[3] *Lancet*, Jan. 5, 1952, p. 42.

The committee readily recognise the general practitioner's claim to access to radiological departments and laboratories, and they think that the future development of these services should be related to his needs as well as to those of the hospital and specialist services The Sheffield scheme for medical coordination committees, described on another page, is a practical step towards making sure that the practitioner is not overlooked in planning, whether on the long or short view Some of his just demands may be hard to meet today, but we can ensure that they have consideration, and where necessary priority, tomorrow

Fat-embolism

FAT-EMBOLISM in man was first described by ZENKER in 1862, and it is now regarded as a not uncommon cause of death after fractures of long bones It has also been reported as a sequel of burns, poisoning, and parturition, and in association with fat-necrosis, fatty liver, caisson disease, osteomyelitis, diabetes mellitus, eclampsia, pancreatitis, and tuberculosis, but in some of these conditions metabolic lipæmia may have been confused with true fat-embolism The clinical manifestations are essentially pulmonary or cerebral, but emboli are sometimes found in other organs, including the kidney and skin, and occasionally they are associated with bone marrow embolism [1] FRIESEN and his associates [2] ascribe to this cause the peptic ulcers and erosions sometimes associated with fractures of long bones

The incidence of pulmonary fat-embolism is uncertain, because this disorder is so often associated with severe shock, which gives rise to similar symptoms and necropsy findings, the only point of differentiation may be the abundant ectopic fat in the lung Some idea of the incidence is to be had from figures reported by ROBB SMITH,[3] who found that of 125 cases of fatal accident 41 showed evidence of gross pulmonary involvement, these 41 included 6 where there had been no bony injury, and in 29 death was attributed directly to the embolism Fat apparently acts as an embolus when the globules exceed 8 μ in diameter [4], and symptoms referable to pulmonary emboli may then appear in anything from three hours up to eight days The disease often simulates bronchopneumonia, but sometimes it manifests itself less directly—for example, by increasingly profound anæmia due to widespread bleeding into the alveolar spaces LEHMAN and MCNATTIN [5] claimed that if the amount of fat reaching the lungs is of the order of 120 ml or more, emboli will pass through the lung capillaries and find their way into the systemic circulation where they will initiate a train of secondary disturbances CARREAU and HIGGINS [6] ascribe the rapid feeble pulse and the drop in blood-pressure to occlusion of the smaller coronary vessels with consequent hyperæmia of the myocardium, while cerebral embolism probably accounts for the restlessness, headache, drowsiness, vomiting, and coma which may occur—sometimes suddenly after a period of apparent recovery—in patients who have sustained serious damage to a long bone Other and more alarming symptoms may follow involvement of the brain, including hallucinations, convulsions, spasms, paralysis, hyperthermia, and maniacal outbursts These outbursts may be confused with alcoholism [7], and in a severely injured person it may be difficult to differentiate fat embolism from intracranial trauma

The pathogenesis of this disorder is still in some doubt CARREAU and HIGGINS, like MILOSLAVICH,[8] hold that fat-embolism will occur when fat globules, liberated by disintegration of the supporting fibrous tissues of the bone-marrow fat or adipose tissue, are sucked into torn veins, and that this process is enhanced by increased pressure from local bleeding GAUSS [7] in 1916 suggested that the explanation of the common association of fat-embolism with fractures of long bones was that the veins in the locality are surrounded by a bony wall and so cannot collapse as they can elsewhere in the body, while MILOSLAVICH ascribed its supposed greater incidence in old people to the greater fluidity of their marrow fat TOCANTINS,[9] however, claimed that the marrow cavity communicates directly with the venous circulation SCUDERI [10] expressed doubts as to the nature of the fat, for he found that all the bone-marrow fat extracted from a femur was insufficient in itself to cause death He thought that the lethal substance was not neutral fat but one of its split products—oleic acid—which was seven times as toxic as neutral fat and was present in lethal quantity Likewise JEFFERSON and NECHELES [11] hold that fat-embolism per se may not be dangerous unless fatty acids are released in or into the circulation On the other hand, the transported material has been shown to give the staining reactions for neutral fat [12] ARMIN and GRANT [13] suggest that gross pulmonary fat-embolism is unlikely to cause obvious symptoms or to account wholly or even partly for death They found that, in order to produce in the rabbit's lung a degree of disease comparable to that which in man might be described post mortem as "severe," it was necessary to inject 0 15 ml of homologous renal fat per kg body-weight, and even this amount caused no evident disturbance in the animal In the rabbit the fatal dose of fat, introduced intravenously, was given by WARTHIN [14] as 0 5–1 ml per kg body-weight, while

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[1] Rappaport H Raum M Horrell, J B *Amer J Path.* 1951 27 407

[2] Friesen S R et al *Surgery* 1948 24 134

[3] Robb-Smith A H T *Lancet*, 1941, i, 135.

[4] Harman J W Ragaz F J *Amer J Path* 1950 26, 551

[5] Lehman E P, McNattin R F *Arch Surg* 1928 17, 179

[6] Carreau E P Higgins G A *Arch intern Med* 1951, 88 69

[7] Gauss H *Ibid* 1916 18 76

[8] Miloslavich E L *Wisconsin med J* 1930 29 139

[9] Tocantins, L M *Amer J Physiol* 1943, 139, 265

[10] Scuderi C S *Surg Gynec Obstet* 1941, 72, 732

[11] Jefferson, N C, Necheles, H *Proc Soc exp Biol.*, 1948 68, 248

[12] Denman F R Gragg L *Arch Surg* 1948, 57, 325

[13] Armin J, Grant, R T *Clin Sci* 1951, 10, 441

[14] Warthin A S *Int Clin* 1913, 4, 171

Simmonds[15] mentioned amounts of the order of 2 ml. per kg. Armin and Grant found however that in the rabbit a degree of fat-embolism which in itself was not fatal might become so when the circulation was disturbed by reason of considerable bleeding and that death might be averted by transfusion. Harman and Ragaz noted that with either dehydration or "tourniquet shock" the mortality from injection of homologous fat into rabbits was significantly increased, and the manner of death altered—an acute mode of death was converted to a "peracute type of dehydration". Friesen et al. found that in dogs the incidence of gastric erosions was increased when the fracture was accompanied by administration of histamine. Death by fat-embolism in animals has been shown, therefore, to be determined not only by the quantity and quality of fat entering the circulation but also by preconditioning. Incidentally bleeding to death had the effect of raising the average embolic fat content in Armin and Grant's animals from 6·2 to 13·1% of the dried lung weight—double the figure found in clinical cases of fat-embolism. How far, however, it is justifiable to compare the experimental disease with traumatic lipæmia in man is questionable. In the rabbit for instance, about 85% of the fat was recoverable from the lung and little, if any, was found in the brain and kidney.

Clinically the diagnosis of fat embolism is probably justified only if there has been an injury causing fracture of a long bone or severe soft-tissue trauma. There are, however, some aids to diagnosis. Garreau and Higgins suggest that the most helpful of these are radiological examination of the chest, and in the later stages, examination of the urine for floating fat. Scuderi has also detected fat in blood by dark ground illumination, while Wilson[16] recommends diagnostic lung puncture. Both Vines[17] and Robb-Smith suggested examination of the sputum for fat, which should be sought after the œdema fluid has been expectorated: it then lies free and is thus distinguished from fat contained in histiocytes. At necropsy it may not be easy to distinguish fat-embolism from metabolic lipæmia and post-mortem changes; in fact, Lehman and McNattin state that the disorder cannot be diagnosed anatomically. With regard to prevention, early immobilisation of fractured bones is important; and in suspected cases oxygen and antibiotics should be administered. How vigorously shock should be combated is perhaps open to question. To some clinicians it seems that fat-embolism is sometimes liable to occur in patients who are not greatly shocked; and rapid restoration of the blood pressure may possibly precipitate this complication. Specific measures such as proximal venous ligation, the application of a tourniquet above the fracture, and intravenous saponification of the globules seem to have little value.

In itself fat-embolism of the lung is not often fatal because the transported fat is usually removed by the body and the disturbed circulation redressed; indeed in the lung the infarction is commonly transitory. On the other hand lodgement in the brain of fat globules beyond the critical size is likely to threaten life by reason of anoxia of vital centres.

Sources of Vitamin B_{12}

In 1948 vitamin B_{12} was isolated from liver by Lester Smith and Parker in this country and by Rickes and his colleagues in the U.S.A. Both groups of workers were applying new techniques to the further purification of the anti-pernicious-anæmia principle known to be present in extracts of liver; and since the effective dose of vitamin B_{12} for a patient with pernicious anæmia in relapse is measured in fractions of a milligramme they clearly succeeded very well. Subsequent work has surprisingly shown that vitamin B_{12} is very widely distributed in Nature; and the exploration of alternative sources has taught us a great deal about the compounds in which it is found and about the rôle of vitamin B_{12} in animal metabolism.

Vitamin B_{12} was originally isolated from liver by two methods. In one paper chromatography was used, while in the other advantage was taken of the fact that the vitamin is a necessary growth factor for certain lactobacilli; later, when it was found that each molecule of vitamin B_{12} contains an atom of cobalt, search for cobalt-containing pigments became a practical method. The microbiological method first suggested that vitamin B_{12} was present in unexpected places; and at this point Rickes and his colleagues[1] found that material from the mother liquor in which *Streptomyces griseus* had been grown had vitamin B_{12} activity. This material has since been shown to be a cobalt-containing pigment with exactly the same properties as liver vitamin B_{12}, and nowadays the vitamin is obtained mostly from this source. It is a remarkable tribute to modern commercial chemical technique that, though the fermentation liquor contains only about 1 part per million of vitamin B_{12}, the vitamin can be supplied so cheaply that a patient with pernicious anæmia can be maintained in good health for as little as 2½d.–10d. a week. It was also soon found that vitamin B_{12} is present in significant amounts in the fæces of normal persons and of pernicious-anæmia patients. It is produced by bacteria in the colon, though it is not absorbed there. It is therefore not surprising to learn from Hoover et al.[2] that there is a large potential supply of the vitamin in activated sewage sludge. Hausmann and his co-workers[3] in Germany along with others elsewhere have shown that cobalt-containing pigments are present in cow dung, sheep dung, beef muscle, and various bacterial cultures. These pigments at first proved inactive when given to patients with pernicious anæmia in relapse and sometimes also when tested microbiologically; but after digestion with hog stomach mucosa or with pancreatic enzymes they showed typical B_{12} activity. Hausmann therefore concluded that the original pigments were conjugates of vitamin B_{12} and peptides. In this issue Dr Hausmann and Dr Mulli describe yet another source of vitamin B_{12}—the press juice from autoclaved fish. The cobalt-containing pigments from this source, though microbiologically active, were clinically inactive; but treatment with potassium cyanide converted them into clinically active pigments, and the material then showed the typical absorption spectrum of vitamin B_{12} This finding is interesting because the vitamin contains a cyanide (-CN-) group, and when this group is replaced by a hydroxyl (-OH-) group a slightly different pigment—vitamin $B_{12}b$—is produced which is also clinically active in pernicious anæmia HAUSMANN suggests that potassium cyanide acts on the fish pigment, not by changing $B_{12}b$ into B_{12}, but by again breaking up a B_{12}-peptide linkage The important feature of these researches of HAUSMANN and others is the discovery that vitamin B_{12} exists in Nature mostly in bound forms that are only sometimes microbiologically active and never hæmopoietically active in man, and that microbiological assay of possible sources of the vitamin may therefore give misleading results unless preceded by chemical manipulations to release the vitamin from its peptide or other linkages Microbiological methods of assaying vitamin B_{12} are unreliable and will certainly be replaced eventually by chemical methods, but, so far, according to LESTER SMITH,[4] chemical methods are applicable only to moderately pure concentrates

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[15] Simmonds, J. L. J. exp. Med. 1918, 27, 539.
[16] Wilson, J. V. The Pathology of Traumatic Injury. Edinburgh, 1946; p. 61.
[17] Vines, H. W. C. Green's Manual of Pathology. London, 1949; p. 73.

[1] Rickes, E. L., Brink, N. G., Koniuszy, F. R., Wood, T. R., Folkers, K. Science, 1948, 107, 396.
[2] Hoover, S. R., Jasewicz, L. B., Porges, N. Ibid, 1951, 114, 213.
[3] Hausmann, K. Lancet, 1949, ii, 962. Hausmann, K., Mulli, K. Proceedings of the Third International Congress of Hematology. New York, 1951; p. 41.

TERNBERG and EAKIN [5] have shown that gastric juice converts vitamin B_{12} into a "protein-bound" form This seems to contradict HAUSMANN's results, but HAUSMANN points out that these "protein-bound" forms are not the same as the naturally occurring "peptide-linked" forms, the former, for instance, are not available to bacteria, whereas the latter can be LESTER SMITH [4] suggests that probably the only primary source of vitamin B_{12} in Nature is "the metabolic activity of micro organisms" He points out that the vitamin is synthesised by a wide range of bacteria and actinomycetes, but not by yeasts or fungi, artificial addition of 1 part of cobalt per million to the culture-medium greatly increases the yield of the vitamin The bacteria present in the rumen of herbivorous ruminants can synthesise B_{12}, which corresponds with the observation that the livers from these animals provide the best extracts for the treatment of pernicious anæmia Herbivorous animals that are not ruminants presumably get their vitamin B_{12} from intestinal bacteria The vitamin is now known to be widely distributed in animal foods, but is almost, if not entirely, absent from products of the higher plants Assays that take into account the presence of bound forms show that beef, veal, and lamb muscle contain about 2–8 µg of vitamin B_{12} per 100 g, fresh liver and kidney contain 42–47 µg per 100 g

There is now much evidence that vitamin B_{12} is a true vitamin—an essential nutritional factor—for many animals, but it is as a growth factor and not as a hæmopoietic factor that it is important This discovery is disappointing for the experimentalist trying to work out the ætiology of megaloblastic anæmias in man, but it is very significant for animal husbandry An "animal protein factor" is known to be concerned in the proper growth of pigs and hens, and to promote egg laying in hens The sources of this factor are similar to those of vitamin B_{12}, and experiment has shown that crystalline vitamin B_{12} can replace the animal protein factor, at least to a large extent Thus baby pigs given a synthetic diet with soya protein fail to thrive, but administration of vitamin B_{12} restores growth, the vitamin can be given orally or parenterally, the oral dose being about twice the parenteral dose This contrasts strikingly with clinical experience, for in pernicious anæmia the oral dose is 10–20 times the parenteral dose In animals aureomycin and streptomycin enhance the effect of vitamin B_{12}, and this seems to account for the astonishing growth-promoting activity of these antibiotics The growth-promoting effect of vitamin B_{12} may also operate to some extent in man WETZEL and his co-workers [6] gave 10 µg daily by mouth to children who were undersized because of long sickness or simple malnutrition, and they concluded that these children improved much more rapidly than they otherwise would have

In three years an immense amount has been written about vitamin B_{12}, as reviews by LESTER SMITH [4] and UNGLEY [7] testify In human disease knowledge about its practical use has far outstripped the theoretical explanation of its effects The wide distribution of vitamin B_{12} in animal foods and the demonstration that it can be released from bound forms by, for example, pancreatic enzymes, support the theory that in pernicious anæmia the absorption of it from the alimentary tract is somehow at fault Moreover, since achlorhydria is the constant concomitant of pernicious anæmia it is not unreasonable to suppose that this defective absorption is primarily due to some failure of the stomach secretion Workers have too often ignored the fundamental importance of the gastric lesion, which was well appreciated by CASTLE in the U S A and by WILKINSON in this country twenty years ago and has been re-emphasised by UNGLEY [8] So far we have no satisfactory theory about the part played by vitamin B_{12} in the ætiology of pernicious anæmia

Prescribing in Northern Ireland

IN Northern Ireland the cost of prescriptions under the National Health Service has given even more cause for concern than in Britain, and the problem has been broached with correspondingly greater vigour Like the authorities in England and Wales and in Scotland, the Northern Ireland General Health Services Board [9] made known to practitioners the interim findings of the Cohen Committee [10], but it went further by issuing, last February, a notice to the public pointing out that the cost of medicines and appliances was £1 0s 4d per head per annum, compared with 15s 6d in England and Wales, and announcing that practitioners would not prescribe (1) remedies selected by the patient himself, (2) laxatives, vitamins, or "tonics," except for the treatment of definite clinical conditions, (3) malt and cod-liver oil except in active tuberculosis or other organic disease, or (4) cotton wool or other dressings and disinfectants for routine use Furthermore the board began to furnish every doctor with particulars of the average cost per patient of his prescriptions, together with comparative costs for his area and for all areas together Though the latest annual report [9] shows some effect from these measures, its figures stop at the end of March, and therefore give us little information But the board is satisfied that the cost is capable of reduction without detriment to the services if the public will try "to keep down expense rather than to obtain 'full value'"

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[4] Smith E L *Nutrit Abstr Rev* 1951 20 705

[5] Ternberg J L Eakin R E *J Amer chem Soc* 1949, 71, 3858 See leading article *Lancet* 1950 i 500

[6] Wetzel, N C Fargo W C, Smith, I H Hellikson J *Science*, 1949, 110, 651

[7] Ungley, C C *Nutrit Abstr Rev* 1951 21, 1

[8] Ungley, C C See *Lancet* 1951, ii 1068

[9] Third Annual Report 1950–51 Pp 53 1s

[10] Second Interim Report of the Joint Committee on Prescribing H M Stationery Office 1950, see *Lancet*, 1950 ii 66

Annotations

WAYS OF USING MASS RADIOGRAPHY

We are all agreed by this time that mass radiography units should not be used indiscriminately As Dr W H Tattersall puts it (p 202) they should fish in the best waters. It only remains to decide which waters are the *best*

In our last issue Dr Halliday Sutherland said that there is more undetected active pulmonary tuberculosis among the patients under treatment by general practitioners than in any other group in the community The mass-radiography service which he arranged in Birmingham for patients referred by their doctors made an impressive catch 157 cases of active tuberculosis out of 5702 examined Dr Tattersall on the other hand proposes that mass-radiography units should be concentrated *geographically* where the tuberculosis mortality rates are highest, and *functionally* on sections of the community especially exposed to risk He wishes therefore to see them distributed to such industrial centres as the Durham and Northumberland coal and steel towns, the Potteries, the South Wales coalfields and the great seaports; and he would like to see three or four units operating together in such black spots The aim in his view should be to discover every single case in the area and so eventually bring the disease under complete control. This could not be done while even a solitary infectious patient escaped detection and the long term supervision of contacts would be an essential part of he campaign He suggests that in other areas fluoroscopy ould be used quite successfully to exclude chest illness n patients referred by general practitioners The chest hysician could undertake these examinations at the est clinic and general practitioners could be encouraged send cases with even the most trivial symptoms This ggestion deserves serious thought because it would certainly be a cheap and easy way of examining large numbers of cases. But there are objections to it For one thing fluoroscopy takes longer than radiography and if very large numbers of patients were referred—as it is to be hoped they would be—the chest physician might find it difficult to fit in the work Then if general ractitioners have a quick eye for a suspicious case as Dr Sutherland's yield suggests, the group of patients hey send ought to be examined by the most accurate method available and one which gives a lasting record ere, in fact, are some of the best waters for our fishing oreover as Dr Sutherland points out patients will tend a mass-radiography unit for investigation more adily than a chest clinic Prejudices of this kind ugh foolish are potent and should be duly regarded There are difficulties as we have said before,[1] in empting to find every single case in a population For thing mass radiography is an expensive technique cost of finding an unrecognised case ranging in ous surveys, from £11 to over £100 or—in one exceptional survey—to £600 If the method offers a reasonable hope of eradicating tuberculosis from even one of our black spots a concentrated attack would be well worth trying for the effect of such an example on our whole attitude to the disease could not fail to be dramatic But a complete survey will not be easily achieved People must attend voluntarily for examination and there are still some about who believe—wrongly in this instance—that what goes on inside their chests is their own affair Dr Hoffstaedt (p 217) is not alone in wondering how they are all to be coaxed into coming for examination Nevertheless the North West Metropolitan regional hospital board as recorded in our Public Health column last week are planning to survey the entire adult population of the borough of Islington and have set up a mass radiography unit for the purpose Some 500 people in the borough it is estimated will prove to have pulmonary tuberculosis of which they are unaware The question then arises, how soon should the survey be repeated? People are quite often found to have tuberculosis, sometimes already cavitating within a few weeks or months of giving a normal radiograph These pitfalls must all be kept in mind. Dr Tattersall's view is that if a preliminary complete survey were followed by close supervision of all patients (especially sputum positive ambulant cases) and contacts it should be possible to discover most new cases as they arise Migrants into the area of course would need to be examined and should be advised to attend the chest clinic or the mass radiography unit for examination by their new doctor when they transfer to his list Any new cases cropping up which were not contacts of a known case should be tracked to their source

It would be a mistake, however to tie up all our mass radiography units in long term investigations of black spots Some should certainly be used for the study of selected populations—not only patients referred by doctors but also the staffs of industries with a dust hazard (particularly those employing young women) school staff and others in regular contact with children school leavers young people entering the Forces, wom attending antenatal clinics chronic sick and prospecti employees whose employers wish it—as well of cour as contacts and volunteers from the general populatio It is possible that careful follow up of the cases foun in such limited surveys, and of their contacts, would lea as surely in the end, to the discovery of every case i an area as would a more comprehensive survey bu this can only be settled by experiment

DIMERCAPROL FOR HEPATOLENTICULAR DEGENERATION

Dimercaprol (2 3-dimercaptopropanol) was originally introduced under the name of British anti lewisite or Bal, as an antidote for poisoning with arsenical gases It was soon found however to promote the excretion of other metals besides arsenic and in 1948 Mandelbrote and his colleagues[1] showed that it increases the already abnormally high copper output in the urine of a patient with hepatolenticular degeneration (Kinnier Wilson's disease) This significant finding was confirmed by Porter[2] and last year Cumings[3] described the results of a clinical trial in which 2 out of 4 cases treated over a period of some months with several courses of dimercaprol were definitely improved

Denny Brown and Porter[4] have now recorded 5 cases treated with dimercaprol for between twelve and twenty-seven months. In all of these the clinical results were very encouraging but the investigators are careful to point out that their 5 patients are suffering from the more chronic or pseudosclerotic form of hepatolenticular degeneration in which the characteristic pathological changes are pigmentation and glial proliferation rather than the softening and cavitation seen in the more rapidly progressive type Cases of the latter type which is usually met with at an earlier age are they think less likely to show much improvement under treatment In their patients there had been tremor in the upper limbs, dysarthria titubation of the head and trunk and dystonia, for between four and thirteen years before assistance was needed with walking dressing and eating but by the time they came to be treated 2 of the 5 patients could not even move without help Under treatment benefit was noticed about a fortnight after the first course of dimercaprol and continued for two to three months. A relapse then followed but further courses proved as effective as the first and in this way

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[1] *Lancet* 1950 ii 50

[1] Mandelbrote B M Stanier M W Thompson R H S Thruston M N *Brain*, 1948 71 212

[2] Porter H *J Lab clin Med* 1949 34 1623

[3] Cumings J N *Brain* 1951 74 10

[4] Denny Brown D Porter H *New Engl J Med* 1951 245 917

Denny-Brown and Porter were able to maintain improvement until it was clear that the treatment would not benefit the patient any more By that time 4 of the 5 could fend for themselves, and even the 5th patient, who had shown considerable mental and physical deterioration before having dimercaprol, had made some improvement A side observation of some interest is that in 2 patients the Kayser Fleischer corneal rings (present in all 5) lost much of their brownish colour As Newell et al [5] have shown that dimercaprol removes experimentally introduced intra ocular copper, this observation lends support to the view that Kayser-Fleischer rings are, partly at least, attributable to copper deposited in the cornea

Dimercaprol was given intramuscularly as a 10% solution in peanut oil, care being taken to avoid subcutaneous deposition because this gives rise to painful lumps Injections approximated to 2 5 mg per kg of body-weight, but they were reduced when necessary to avoid unpleasant side-effects, which at this strength included transient nausea and vomiting, dizziness, and blurring of vision No serious toxic effects were encountered save in 1 patient when a single injection of 7 mg per kg body-weight evoked a hæmatemesis In the earlier months of the trial, injections of dimercaprol were given every four hours for twenty four hours, repeated twice at five day intervals, but later it was found more convenient to give twice daily injections of 1 0–1 5 ml for ten to twelve days The recommendation is that such a course be repeated monthly until a steady clinical status is reached, after which a maintenance course of a similar order should be given every second month

Clinical evidence of liver damage was apparent in only 1 patient before dimercaprol was given, and liver-function tests showed only mild hepatic insufficiency in the other 4 A close watch was kept for indications of further hepatic damage after treatment had started, but such damage was never apparent Nevertheless all 5 patients showed a resting urinary copper output ranging from 207 to 713 µg per twenty four hours, as compared with the normal levels ranging from zero to 14 7 µg quoted by Porter [6] The effect of four-hourly injections of dimercaprol in a strength of 7 mg per kg body-weight was to raise the resting output of copper in the urine some 2–7 times in the first twenty-four hours, though it afterwards fell rapidly and returned to the resting level on the third or fourth day It was estimated that in this way during one three day course about 3–4 mg of copper was mobilised this would be about half the copper-content of a normal liver but is only about 5% of the copper-content of the liver in hepatolenticular degeneration, in which condition both liver and brain contain excessive amounts of the metal [7] As the bile is normally the chief route of copper excretion Denny-Brown and Porter carefully estimated the copper content of the bile in 3 patients expecting to find the output by that route lowered by the hepatic damage, but the biliary copper content turned out to be normal in all 3 They think that the increased urinary output of copper must be attributable to overabsorption of the metal, which results in high serum copper levels, as found by Glazebrook [8] and Cumings,[3] with retention in the tissues and overflow over a renal threshold Like Cumings they found that dimercaprol had no effect on the amino aciduria which was noted in all their patients and which ordinarily fluctuated a good deal

Thus there is now good evidence that the neurological symptoms of hepatolenticular degeneration are related to the abnormal accumulation of copper compounds in the brain Denny Brown and Porter have shown that such symptoms as tremor and rigidity, even when of long duration, lessen considerably when copper is repeatedly mobilised with dimercaprol, and they very reasonably suggest that the earlier such treatment is begun the more complete recovery will be Yet it remains to be seen whether earlier cases will prove equally amenable to dimercaprol, for in treating his 4 patients Cumings saw no substantial improvement in the 2 who neither had signs of liver damage nor had both a raised excretion of copper and a raised excretion of amino acid nitrogen in the urine Further trials with younger patients and earlier cases are now required

POISONING FROM MATCHES

White or yellow phosphorus has not been used in the manufacture of matches since the Berne Convention of 1906 It has been replaced by phosphorus sesquisulphide (P_4S_3) in the heads of the "strike anywhere" matches, and by potassium chlorate and other ingredients in safety-match heads Red or amorphous phosphorus is present in the striking surface of safety match boxes.[1] Both red phosphorus and phosphorus sesquisulphide are thought to be relatively non-toxic Recent evidence put forward by Burgess [2] suggests, however, that phosphorus sesquisulphide may cause not only dermatitis of the face and eyelids but also mild systemic phosphorus poisoning

He describes the cases of two women, both of whom used the friction or "strike anywhere" matches to light cigarettes One, aged 61 years, had severe dermatitis of the eyelids and face in 1933, lasting about a year Her teeth became very loose, and though there was no caries they were all extracted The skin lesion gradually subsided, but there were occasional recrudescences in the succeeding years In 1941, she began to get attacks, increasing in severity and frequency, of œdematous dermatitis on the original sites These attacks were accompanied by prostration, severe vertigo, loss of appetite, and nausea and vomiting Investigations over the years failed to reveal the cause of the condition until a chance remark led her medical adviser to suspect that friction or "strike anywhere" matches might be implicated A patch test with a friction match gave a delayed positive reaction, and further tests with a safety-match and the friction side of a safety match box were also positive in 48 hours. Since the patient gave up using matches the toxic symptoms and the skin lesions have cleared up completely The second case was a 31-year-old woman who had had recurring œdematous dermatitis about both eyes and cheeks for 9 months For the previous 2 years the upper and lower teeth had been somewhat loose, and she had had transitory attacks of dizziness Patch tests with friction matches were positive within 20 hours, and there were also slight positive reactions from a safety match tip and the friction surface of a safety-match box The symptoms and signs promptly cleared up when the patient gave up using matches Her dentist reported that her teeth have improved, though it is not stated wheth the loose teeth have become firm again

Burgess says that though no similar cases have been described they may not be uncommon The skin manifestations may be explained by sensitivity to phosphorus sesquisulphide and its combustion products The causes of the systemic toxic symptoms and the dental changes are more difficult to assess These bear some resemblance to mild industrial phosphorus poisoning It is possible, but unlikely, that unoxidised atoms of phosphorus might be present in match combustion fume Incomplete oxidation forms of phosphorus, such as the trioxide (P_4O_6) and the pentoxide (P_4O_{10}), or the phosphorus sulphides, could through inhalation give rise to slow, mild phosphorus poisoning

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5 Newell F W, Cooper J A D Farmer, C J *Amer J Ophthal* 1949 32 161

6 Porter H *Arch Biochem Biophys* 1951 31, 262

7 See *Lancet* 1951 i 1404

8 Glazebrook A J *Edinb med J* 1945 52, 83

1 See *Lancet* 1950, i 553

2 Burgess, J F *Canad med Ass J* 1951, 65, 567

It so happens that in the south of England the safety match is largely used, whereas in the north and in Scotland the red headed 'strike anywhere' match which contains phosphorus sesquisulphide is more popular We know of a man who during the late war had to make periodic trips from London to Edinburgh and who developed œdematous dermatitis of the face and eyelids each time he went north The trouble was finally traced to the use of the 'strike anywhere' matches which he bought in Edinburgh It is not known whether loosening of the teeth is more prevalent among smokers in the north than it is in the south and the dental profession might regard this as a fruitful field to investigate in association with the dermatologists

MATERNITY BENEFITS

WHEN funds are low the State like the private citizen must take pains to lay out its cash to the best advantage. In 1950 Dr Edith Summerskill, then Minister of National Insurance asked her advisory committee to look into the question of maternity benefits and to see whether without adding at all to the present outlay the money spent could be more equitably distributed The committee have now reported[1]

Under the National Insurance Act 1946 the maternity grant was set at £4 women in gainful occupations receive a maternity allowance of 36s a week for 13 weeks, beginning with the 6th week before the expected date of confinement and furthermore those not eligible for the maternity allowance (because they are not in work) can claim an attendance allowance of £1 a week for the 4 weeks following their confinement towards the cost of domestic help If the confinement is delayed the maternity allowance can be continued for more than 13 weeks but the woman cannot draw this allowance while she is working By regulations, neither sickness nor unemployment benefit may be paid at the same time as maternity allowance or attendance allowance but either may be drawn instead if of greater amount Unmarried women are eligible for maternity benefit, on their own insurance contributions on the same conditions as married women A married woman in gainful occupation however is allowed to choose whether to pay National Insurance contributions or not She cannot have unemployment or sickness benefit unless she contributes but at present she does get the maternity allowance—for which the only requirement is that she should have been in work for 45 weeks of the year preceding the 6th week before her expected confinement. The committee propose that in future maternity allowance shall be payable only to women who pay contributions and that the same total sum (£23 8s) should be paid at the rate of 26s (instead of 36s) for a period of 18 weeks, beginning from the 11th week before the expected date of confinement; if the confinement is late the time of benefit should be extended, as it is at present. During the year ending at the 13th week before the expected confinement date the mother must have paid 45 contributions (or been credited for weeks of unemployment or sickness but at least 26 contributions must have been paid) Sickness or unemployment benefit should not be payable at the same time as the maternity allowance but (as at present) whichever is the larger sum may be claimed Women who have dependants should be allowed to claim dependency benefit besides the maternity allowance

The committee were told by several witnesses that the woman confined in hospital has fewer expenses than the woman confined at home and they have proposed changes in the attendance allowance to straighten this out They propose that the present maternity grant of £4 "should be replaced by a new prenatal grant which should be increased at the earliest opportunity to an amount substantially in excess of the present sum of £4" and they think the proposed changes in the maternity allowance should release some money for this purpose They also propose that the present attendance allowance of £1 a week for 4 weeks should be replaced by a new grant, to be called (most confusingly) the maternity grant of £3 when the confinement is in hospital and £6 when the confinement is at home and when a woman is entitled to the new maternity allowance she should also be entitled to both the prenatal and the maternity grant, without further contributions. In all other cases either the woman or her husband must have paid 26 contributions during the preceding year

These new provisions, if accepted should mean a much fairer distribution of available money

HORMONES IN PEPTIC ULCERATION

CORRESPONDENCE in this issue reminds us that not everyone is agreed about the value of psychotherapy for patients with peptic ulcers On the other hand every textbook attests to the relation between such ulcers and anxiety and Gray and his associates[1] now suggest that the 'pituitary-adrenal axis' is involved in this relationship as in so many other of the body's processes. Thes workers have treated six normal subjects with A.C.T.H and with cortisone and have followed indices of gastr activity such as the acid and pepsin secretion into th stomach and the uropepsin excretion in the urine. I every instance treatment increased these indices to level usually associated with an active duodenal ulcer the effects were greatest after 7–14 days of continuous therapy In one patient with a known gastric ulcer, administration of A.C.T.H produced signs of impending perforation and pronounced increase in secretion of pepsin In another patient treated with A.C.T.H uropepsin excretion rose to unusually high levels this patient had a massive and fatal gastric hæmorrhage and duodenal perforations Gray and his colleagues conclude that chronic emotional and physical stress may b transmitted to the stomach by a hormonal mechanism

This work may come as something of a surprise to those who have regarded the vagus nerve as the chief pathway for impulses from the mind to the stomach Since the days when Beaumont patiently observed the emotional paling and flushing of the gastric mucosa in the temperamental Alexis St Martin there has been repeated experimental proof that the emotions can rapidly influence the human stomach and this suggests a nervous mechanism Furthermore experimental vagal stimulation produces increased gastric motility and secretion—changes which are found when an active ulcer is present Indeed the vagus nerve has often been resected as a remedy for peptic ulceration and this operation has had its measure of success. No doubt supporters of the hormone hypothesis of ulcer production will say that the operation also gives the patient physical and mental rest during recovery and convalescence Exponents of the vagus nerve theory may then retort that ulcer patients do not have moon faces as one would expect if their malady was due to constant overproduction of cortical hormones Probably the truth is that both mechanisms are active but neither is the primary cause of the ulceration It would be interesting to know how commonly peptic ulcers occur in patients with Addison's disease or Simmonds's disease At least it is clear however that the development of peptic ulceration and its complications is a hazard in adrenal cortical therapy and the presence of an ulcer may be a contra indication to such treatment

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THE EARL OF LIMERICK has been appointed chairman of the Medical Research Council in succession to the late Lord Addison

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[1] Maternity Benefit H.M. Stationery Office 1952 Pp 35 1s 3d

[1] Gray S J Benson J A Reifenstein R W Spiro H M. J Amer med Ass 1951 147 1529

Special Articles

THE CONTROL OF TUBERCULOSIS IN BRITAIN*

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“FIND, treat, isolate, and educate the sputum-positive patient ” is an excellent maxim so far as it goes , but there is widespread belief that more could and should be done to eradicate tuberculosis in this country Developments in tuberculosis control during the past ten years or so have been rapid we have seen world-wide application of X rays in diagnosis, progress in thoracic surgery, the discovery of at least two effective chemotherapeutic substances, acclamation of B C G , and (perhaps most important of all) further understanding of the pathogenesis of the disease At the same time, this country has completely reorientated her health services, and has a fresh opportunity to integrate new methods with the best of the old

The old hypotheses of “ exogenous reinfection ” and “ endogenous exacerbation ” are considered obsolete , the work of Medlar and Terplan in the field of morbid pathology, the patient observations of Heimbeck, Wallgren, and others in the field of epidemiology, and the admirable study of Kallman and Reissner on hereditary tendencies all point to a more useful hypothesis namely, that progressive tuberculosis is more likely to occur in the years immediately following infection, and that those hereditary and environmental factors which seem to influence the occurrence of disease are especially important after initial infection in adolescence and early adult life When such infection has been successfully overcome, the individual acquires additional resistance against later progressive disease

MASS RADIOGRAPHY

Mass miniature radiography (M M R) is at present the spearhead of case finding among the “ healthy ” population There are not likely to be more than about 80 units available in Britain for some time, and therefore the immediate problem is to use them to the best advantage It has been seriously advocated that everyone “ should have the opportunity ” of being examined by mass radiography, and that units should therefore visit every town, large and small, throughout the country It has also been suggested that if they were more mobile, and worked faster, they could come nearer the utopian ideal of radiographing the whole community regularly But at the rate of 40,000 examinations per unit per annum more than 20 units would be needed to keep pace with the birth rate ! Their proper use is clear they must be concentrated *geographically*, where the incidence of disease can be presumed highest (i e where mortality-rates are highest), and *functionally*, on sections of the community specially exposed to risk They should therefore be distributed to areas such as the Durham and Northumberland coal and steel towns and Tyneside ports (notorious for their poverty between the wars), the South Wales seaports and coalfields where there is the additional silica hazard, the potteries, and other big ports, particularly Glasgow, Merseyside, and the East End of London

In these black spots 3 or 4 units should operate simultaneously in a limited district, with the definite aim of discovering every case of tuberculosis at large A first-class publicity agent, and the coöperation of all big industrial organisations, would be needed As one clinic could not hope to observe all the suspects from 4 operating units it would be necessary to strengthen all the chest clinic services, to provide adequate laboratory support for them, and to ensure that hospital and sanatorium beds could be immediately offered to all persons requiring treatment

Each unit should fish in the best waters instead of travelling around the countryside, like a circus visiting small towns If 4 units were insufficient in a densely populated area, even 10 units might be used While some were thus sieving industry, others would concentrate on patients attending clinics and hospital departments, on the general public, or other special groups, and, above all, *directly* on the household contacts of all cases found in these groups As all such contacts should be tuberculin tested, and offered vaccination with B C G where necessary, this work would conveniently be done by the M M R units These would also probably have to help out with the inevitable overloading of the ordinary X ray facilities in chest clinics which such a concentrated survey would impose

As the first epidemiological objective was attained —namely, the discovery of every case of tuberculosis in an area—intensive, protracted contact supervision would become increasingly important I have pointed out elsewhere (Tattersall 1951a) that such work must be based on an understanding of the social pathology of the disease If the size of the problem warranted it such surveillance might be allocated to a *static* mass radiography unit

CASE FINDING BY FLUOROSCOPY

The chest physician must not only be a consultant competent to advise on difficult cases, but must also provide the means whereby general practitioners can refer for X ray examination patients having only the most trivial claims to pulmonary illness Toussaint and Pritchard (1944) introduced their scheme to meet this need, and their lead has been followed in some areas , but the practice could be much more widely extended I have suggested (Tattersall 1948) that fluoroscopy can fulfil this purpose It is cheaper and quicker than radiography , and the criticism that it gives no permanent record applies to all conclusions depending on clinical judgment

It is instructive to compare (see accompanying table) the yield from mass radiography with Hall's fluoroscopic factory survey (Hall 1942), and also the results of the Bermondsey scheme (Toussaint and Pritchard 1944) with the Reading fluoroscopy service (Tattersall 1948)

YIELDS FROM RADIOGRAPHY AND FLUOROSCOPY COMPARED

—	No examined	Cases discovered	Yield
Mass radiography	Over 4 mill	Active	4 per 1000
Hall (1942) (fluoroscopy)	1370	5 active	3 6 per 1000
Toussaint and Pritchard (1944) (radiography)	2473	69 “ adult type ”	2 8%
Tattersall (1948) (fluoroscopy)	2008	83 “ significant disease ”	2 9%

The comparison shows that before civilian mass radiography was established in this country, Hall had found by fluoroscopy much the same incidence in a factory population as was later found by mass radiography (though his method was criticised at the time by THE LANCET) Also, the type of case examined at the Reading fluoroscopy sessions was comparable to the cases sought for in Bermondsey and Southwark, and here, too the yields were almost identical Ashwin (1949) has analysed the literature on the reliability of fluoroscopic diagnosis and found that 16 observers, after examining 80,000 people, were of the opinion that fluoroscopy is an accurate, cheap, and speedy method of case finding, while 13 observers, after examining over 100,000 people, reached the contrary view It seems justifiable to adopt the cheaper and speedier method when an ancillary X ray service is being used to *exclude* chest illness for general practitioners. Extensive use of fluoroscopy in chest clinics would at once ensure the examination of a substantially greater number of patients immediately after trivial respiratory illness. The strict technique of fluoroscopic examination as described by Hall and Tattersall (1950) should be closely observed

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* The prize essay of the National Association for the Prevention of Tuberculosis, 1951

TUBERCULIN TESTING

Zacks (1931) traced the source of infection to the immediate family in 65% of school-children who developed tuberculosis. Jones Davies (1950) traced the source of infection in 76% of tuberculin positive school children in a rural area of Wales. Dunlevy (1949) *investigated a younger age-group with a smaller range* of contact in the infant welfare clinics of densely populated Dublin and was similarly able to trace contact with an open case in 46% of tuberculin positive reactors

Tuberculin testing is cheap, and the jelly test can be applied easily in schools, at a rate of more than one a minute The testing of *school entrants* will disclose positive reactors whose earlier environment has been mainly within the home and family circle hence this approach gets at the unsuspected infectious case by a back door Such a survey was recently made in Bournemouth on nearly 2000 children (MacDougall Mikhail and Tattersall 1951) The source of infection was traced to an already known case in 60% of the positive reactors, and to an unknown case of tuberculosis in 15% *of the positive reactors Thus for every 300 tuberculin* tests applied in the survey an unsuspected case of pulmonary tuberculosis was discovered

Now that milk borne tuberculosis is becoming rarer in towns, tuberculin testing of school entrants should provide an increasingly sensitive index of the incidence of household infection in any particular community It would be premature to introduce regulations requiring statistical data about tuberculin testing but every encouragement should be given to the school medical service to develop this index of infection With the extension of B C G vaccination among older age-groups tuberculinisation will gradually lose its epidemiological usefulness after adolescence and as the disease becomes better controlled the incidence of positive reactors at school entry should thus be an *increasingly useful guide* to unsuspected morbidity

B C G VACCINATION

Wide use of B C G vaccine in this country cannot be unreservedly advocated until it is possible to prove the safety of every batch manufactured Contamination or change of virulence is a theoretical if remote possibility B C G is admittedly safer than vaccinia virus, but if, a few weeks after its widespread use, a whole batch were found to be virulent the situation would be appalling and whether contamination or loss of attenuation was the cause would hardly matter Extensive production of freeze dried vaccine or a similar stable preparation which could be tested before use, would be a *welcome and important advance*

The clinical evidence in support of B C G is such that few clinicians favour withholding it until scientific trials have given more significant results but the administrative effort required for the tuberculin testing vaccinating and re testing of any large group of people is considerable The problem is to determine the maximal protection that B C G could afford the British people (who have a varying natural resistance to progressive disease a falling mortality and a shifting peak age of infection) bearing in mind that the exact strength of the vaccine cannot be measured and the duration of any acquired immunity is not known (Tattersall 1951b)

One can calculate within wide limits the benefit of such large-scale vaccination (for instance in children about to leave school) by assessing the number of deaths which might be averted

The Registrar-General's *Statistical Review* indicates the population at risk, and gives the deaths from tuberculosis in recent years in that age-group The maximal and minimal numbers of tuberculin reactors can be estimated (say 40–60%) The proportion of anticipated deaths in positive reactors and negative reactors can be surmised: thus a maximum of 40% and a minimum of 10% of deaths might be expected in those already tuberculin positive The degree of protection B C G affords can be placed within the range of 25–75% for five years, let us say after vaccination.

From the above data it can be calculated that for every death prevented among the fifteen year old population during the five years after vaccination between 300 and 2000 vaccinations would be necessary The exact figure would vary from locality to locality and possibly from batch to batch of an unstandardised vaccine; and as the mortality rate fell greater numbers would have to be vaccinated for each prevented death Is it justifiable to vaccinate 1000–2000 children to avoid 1 death during five years? It would be more justified with girls than boys and of course if the protection lasted ten or more years, vaccination at the age of fifteen would be very much more worth while Heimbeck (1948) has affirmed that protection is lasting

Members of the Armed Forces belong to an organised body and have the advantage of a pension for tuberculosis sometimes given on slender grounds To vaccinate this already organised group would be relatively less costly than to vaccinate civilians, and the financial saving to the community for every case prevented would be greater Recruits should be the next special group to be offered vaccination Since pulmonary tuberculosis in teachers, besides affecting their own prospects, may have serious consequences among children, teachers should also be offered vaccination

Intensive mass radiography in a black spot which discovered every case of tuberculosis, should be followed by vaccination of all contacts. In using a living unstandardised vaccine of unproved safety, there is a stronger case for vaccinating contacts than for mass vaccination

Finally, any circumstances which changed the morbidity among young adults and raised the incidence of florid exudative disease would strengthen the case for vaccination of susceptible school leavers. This might happen during a war when widespread vaccination might become the only control measure available Since in such an event communication with Copenhagen might fail production of B C G in this country is a first essential in any preventive campaign

BEDS

Therapeutic advances earlier diagnosis and reorganisation of the health services have all contributed to the fantastic waiting list of 10 000 patients for admission to sanatoria Although some of this list is certainly fictitious, it proclaims a most unsatisfactory state of affairs. The most effective tuberculosis control schemes *have always been based on a generous provision of* hospital or sanatorium beds. Have we enough? The British Medical Association (1950) has appealed for a bed per 1000 of population In Scotland this ratio already obtains but to achieve it in England some 10 000 more beds would be needed It is quite impossible to consider building sanatoria at present nor is it likely that sufficient accommodation could be relinquished by the general hospitals to bring our tuberculosis beds up to this figure

Existing sanatoria might be enabled to deal more effectively with the sputum positive case of moderate severity which is par excellence the type of case need ing sanatorium treatment (Simmonds and Martin 1948) In one large hospital region, in 1949, only 34% of sanatorium beds for adults with respiratory tuberculosis were classed as providing all forms of treatment, 12% were considered suitable only for convalescent or chronic cases Probably 5% of all tuberculosis beds suffice for the needs of the chronic sick who simply cannot be looked after outside, and these should be situated near the patient's own home rather than at a distance, and should be under the charge of his own chest physician Too many so called sanatoria are no more than country convalescent homes caring for coughing consumptives The upgrading of such institutions is not merely a matter of providing X ray equipment and surgical instruments Often the staff accommodation, kitchen arrangements, fabric, and architectural lay out are inadequate, and, since the buildings are usually remote from a general hospital, laboratory services are difficult to arrange All these facilities being lacking, surgery cannot be developed economically However, improvement in the calibre, equipment, and staffing of some of these rustic haunts is undoubtedly feasible, others should be relinquished to other branches of medicine in exchange for a proportion of better situated general hospital beds Beds should only be sought in general hospitals in order that every area should be able to admit its own cases, but they must obviously be provided in terms of whole wards

In our present economic difficulties, patients will have to receive part of their treatment at home Some of the most progressive home treatment schemes have been developed (by chest physicians driven to exasperation) in the poorer neighbourhoods, and they could be applied to more advantage in the better housed areas The responsibility of local authorities and management committees for home treatment schemes is not clearly enough apportioned

The era of the open air sanatorium is over, and the prevalent notion that tuberculosis is most treatable in such surroundings is rapidly being disproved. Trends in therapy (chemotherapy, collapse therapy, and the adjustment of social stress), as well as sheer necessity, indicate that the *treatment* of tuberculosis should increasingly be the responsibility of the chest clinics, supported by beds in local hospitals, and by the relatively few major chest hospitals Most chest clinics in Britain are still so primitively equipped and understaffed that they are not able to fulfil their vital part in the campaign Their inadequacy reflects very severely on the local health authorities, who were responsible for the old dispensaries It also gives rise to misgivings about the enterprise and initiative to be expected of many local authorities in the matters of aftercare and prevention, for which they are still responsible under the National Health Service Act The most urgent need in the tuberculosis service is the improvement of the chest clinics, in distribution, situation, equipment, and staffing

With adequate clinics, development of home treatment, and maximal use of sanatorium and hospital resources, it should be possible to admit all newly diagnosed cases at once Patients should only be in institutions for initial hygienic education and to learn to rest, for specific medical or surgical purposes, or for social reasons The frivolous practice of admitting patients with minimal lesions, who can properly be observed in their homes, should be discouraged Again, as I have shown (Tattersall 1947), the justification for keeping some advanced cases in sanatoria can only be the fond hope of some Dr Micawber ' that something may turn up " Waiting lists have been abolished in some areas their existence should come to be regarded as a reflection on the efficiency of the local service

AFTERCARE

" All measures, other than those which are purely [illegible], which are regarded as desirable for the welfare of the tuberculous patient," is an unsatisfactory description of aftercare, because it suggests that this very important field of work is outside the scope of the responsible physician

Unfortunately, it is true that far too often the medical follow-up of cases comprises little more than a cursory stethoscopic examination (now becoming obsolete practice), inspection of a film, and inquiry as to sputum so that this can be examined if obtainable Only a better medical curriculum, careful training of recruits to the specialty, and a rise in the prestige of chest medicine, can improve the calibre of the medical staff The initiative for our present advance along these lines has come from within the tuberculosis service

It must no longer be taken for granted that so long as the patient has had a successful treatment one can wave the flag and say goodbye The sometime sputum positive patient should certainly be kept under supervision for many years—if not, indeed, for life Use of the term " recovered " in Ministry of Health definitions should be discontinued Relapse is unfortunately too common even after many years (Tattersall 1949), and affects not only the patient's well being but also the public health The ultimate success of initial treatment depends largely on every patient being carefully advised, in later years, about the ordinary problems of life, from digging cabbage-patches to singing in the choir The physician must tactfully reiterate the regimen, and see that adequate nourishment is maintained, that outdoor work, strenuous labour, shift work, and overtime are avoided, and that the patient's life situation is stable Added responsibilities in life too often encourage the " arrested " case to embark on excessive work and forgo proper rest In the long term management of tuberculosis an efficient almoner may be as helpful as the radiographic supervision of the patient

The physician must also supervise personally the industrial rehabilitation of his patient (Tattersall 1952) He should always be willing to telephone an employer about a patient whose former job could be made more suitable (e g, by temporary reduction of working hours or alteration of duties), for it is surprising how often the coöperation of an employer can be won by such a direct approach from a doctor It is not advantageous for the patient to remain off work for many months at the conclusion of his treatment Whenever possible he should resume work while his morale is high Delayed return to work may lead to carelessness in self discipline, and it is the patient's self discipline, in particular, which proper medical aftercare must nurture and encourage

Medical responsibility in rehabilitation does not end with passing the patient to the disablement resettlement officer (D.R O) This lay official must be advised about every case, and suggested employment must be discussed between doctor and patient The D R O can be advised not to recommend any patient to vacancies in the food trade, but medical details of the patient's health should not be disclosed to a lay official Most residential training schemes are not suitable for the tuberculous way of life. Local training, with a view to some particular job at the end, is altogether better, for the patient lives at home and medical surveillance is not interrupted The physician should be familiar with the industries of his area, and especially with any factory where a particular respiratory hazard is known The factory inspector is a useful ally

In this phase of the management of tuberculosis, village settlements, night sanatoria, and Remploy factories are often advocated Their value must always be limited planning does not solve the problems of individual patients, and rehabilitation is always a personal problem, offering great scope for ingenious initiative

An aftercare association can do good work in this direction, but there are still areas of the country where no such organisation exists The National Association for the Prevention of Tuberculosis should actively sponsor the institution of more such bodies.

STATISTICS

Only by careful statistical control can the efficiency of various procedures be checked and regulated. If the chest clinic is to be the centre of vigorous epidemiological attack on tuberculosis the physician must have clear information about the results of his campaign. He must be able to determine, for instance, whether the general practitioners are sending him a sufficient proportion of middle-aged men and, if not, must adjust his efforts appropriately. He must be able to discover the results of his therapeutic procedures, to know what proportion of cases attain sputum conversion, and to ascertain what proportion of his minimal lesions break down, the relation of relapse to social conditions, and the occupation of his chronic sputum-positive cases. All such information can be made available by using one of the special statistical systems.

England (1946) has urged that detailed statistics should be compiled on a national scale. This is perhaps rather ambitious, but there is a strong case for adoption of such a regional scheme, and it is a necessity in an intensive 'black spot' campaign.

FINANCIAL AND SOCIAL HELP

There is an upper limit to the amount of statutory financial relief that even a Welfare State can provide, and this limit has now been attained, it is thought, in Britain. A newly sick patient, however, usually does not know what help he is entitled to, and at those chest clinics which have neither an almoner nor a social worker he often fails to avail himself of what is his due. Almoners are just as necessary in chest clinics as in any other outpatient department, not only to ensure financial support of the patient's family but also to arrange his aftercare and home treatment, and deal with the many social problems which arise in the management of patients with a chronic disease.

ADMINISTRATION

Most of the suggestions which have been put forward could be immediately introduced by the responsible physician, local health authorities, management committees, or regional boards, provided that sufficient staff were available or that lay committees sufficiently appreciated the need for a more enterprising outlook on tuberculosis control. Redistribution of mass radiography units would require the intervention of the Ministry of Health.

Can the organisation of tuberculosis work in the new health service be improved? Is enough use being made of the opportunity to develop control methods on a regional basis? Are there too many committees considering too many details of the service? Is there scope for individual initiative?

The present administration could probably be made as efficient as that of any vast organisation can be, but it needs to be advised and guided by picked men of outstanding clinical experience and administrative ability. This was the principle followed in developing the Lancashire scheme and the Welsh National Memorial Association. Senior responsible administrators should be appointed at regional-board level, and in order that a director of tuberculosis should have reasonable freedom of action to regulate the service a tuberculosis executive committee would probably be needed, as suggested by Lissant Cox, to which he would be formally responsible and which would guide management committees more specifically and in greater detail than is usual in regional-board policy at present. Coöpted members from local authorities (if not too many) might improve the liaison between the two sides of the service.

The division of responsibility between local authorities and the hospital service is very unfortunate, but any further legislation should be avoided if possible, at any rate for some years. After the effluence of post-war statutes some period of adjustment is essential. The task of dividing clinic furniture or physicians' mileage into suitable fractions to the satisfaction of borough treasurer and the finance officers of hospital management committees presents a pretty problem; but a memorandum from the Ministry of Health, clarifying the division of responsibility, might do much to resolve the difficulties, though the best solutions may vary from place to place. It might also be helpful if the Ministry, in allocating the annual block grant to local health authorities, would earmark a certain fraction for the prevention and aftercare of tuberculosis. The present difficulties cannot be entirely resolved by good will and coöperation between the chest physician and medical officer of health; it is essential that the committees of the whole health service become more 'tuberculosis-minded,' for this disease is the foremost medical problem of the moment. The Minister could make his appointments to regional boards accordingly, and boards could be advised to see that tuberculosis interests were more strongly represented on management committees than they are today.

THE ANTI-TUBERCULOSIS CAMPAIGN

Tuberculosis control should be intensified at one or two selected black spots. A vigorous campaign cannot be conducted without a director of tuberculosis services to supervise and coördinate the work, and some preliminary re-shuffling would be necessary at regional level of such resources as clinics, laboratories, and beds. Mass radiography units should be brought into action in whatever numbers are required by the geography and diagnostic resources of the area tackled (a compact population of about half a million is envisaged as suitable). The first objective should be the discovery of all cases of tuberculosis within one year. At the end of this phase the M.M.R. concentration in the area could probably be considerably reduced.

During the second phase of the campaign close supervision of all patients (especially ambulant sputum-positive cases) and extensive contact surveillance would be the principal control measures. During this phase, which would probably last from three to five years, some fresh cases would arise which should if possible be traced to their infective source. A difficulty would be incoming migrants from outside the black spot and the arrival of sailors in the ports. Executive councils could be asked to recommend to the chest clinic, as a routine, all patients from other areas seeking new doctors. The same information might also be given at the food offices, and quarantine authorities should offer it to patients arriving by sea. Toward the conclusion of this second phase there should be a considerable fall in mortality (probably about 80% from the start of the campaign) and also in the proportion of children tuberculin-positive at school entry.

This would introduce the third phase of the campaign, during which the whole programme would begin to shrink to a size manageable by the ordinary chest clinic. The occurrence of any form of primary tuberculosis or benign tuberculin conversion would now be regarded as signalling an 'outbreak' of tuberculosis calling for intensive effort to discover the source case. Most of the original sputum-positive untreatable cases would by now have died, and survivors should be regarded as carriers and supervised as closely as democratic liberty would permit. By the time such a stage in control was reached, public opinion would probably call for stricter application of the sections of the Public Health Act 1936 which deal with the restraint of persons suffering from infectious diseases.

Meanwhile, apart from black spots, control must proceed more slowly Chest physicians should seek increasingly to discover every case of the disease and to supervise patients indefinitely Fluoroscopy should make it possible for chest physicians to examine far more cases after trivial illness, and contact supervision should be extended To enable X-ray departments to deal with the increased work, 5 × 4 in films, recommended by Clarke (1950), should be used Once the chest physician could be reasonably confident that every patient who consulted his doctor for a cough was referred for X-ray examination, he could expect to find very nearly every case of tuberculosis—except the elusive "carriers"—within five years, and he would then be able to pursue, though at a slower pace, a similar campaign to that outlined for black spots

The abolition of tuberculosis in Britain would not be a labour of Sisyphus, it would not even need a Hercules for its achievement The aim of the National Association for the Prevention of Tuberculosis could be fulfilled within ten years if public opinion demanded it

SUMMARY

1 Mass radiography should be concentrated in black spots with the aim of discovering every case there within a year

2 Evidence is submitted justifying the widespread adoption of fluoroscopy in diagnosis, to exclude serious chest disease for general practitioners

3 Routine tuberculin testing of all school entrants should be adopted throughout the school medical service

4 Until each batch can be proved safe, mass vaccination with B C G is not desirable Much greater use can be made of it among contacts Recruits to the Armed Forces, and school teachers, should be the next large groups to be offered vaccination

5 Enough beds for tuberculosis are not likely to be forthcoming Better use should be made of existing resources, demands on general hospitals should be limited to making available local beds for chest clinics Extension of home treatment schemes is necessary Waiting lists could be abolished

6 Aftercare is too often neglected Chest physicians can and should do more to help patients to recover socially and economically, as well as in a narrow medical sense

7 Accurate statistical control is essential to a comprehensive attack on tuberculosis as an epidemiological problem, and should be developed in all clinics, and possibly on a regional basis

8 Social workers or almoners are necessary to supervise the details of financial and economic help which are an integral part of the control programme

9 The organisation of the tuberculosis service requires supervision at regional level by a director of tuberculosis

10 A vigorous anti tuberculosis campaign could be planned in three phases which should result in a substantial fall in tuberculosis mortality within five years

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Zacks D (1931) *New Engl med J* 205 525

TOWARDS MATURITY

At the Conference of Educational Associations, held at King's College, London, on Dec 27, with Prof P E VERNON in the chair, Dr BROCK CHISHOLM, director general of W H O, gave an address at the invitation of the British Psychological Society, one of the constituent bodies of the conference

We find ourselves, said Dr Chisholm, living in a new kind of world, where the conditions for mankind's survival have radically changed We have been fighting one another enthusiastically every 15–20 years since the dawn of history, and killing one another—as individuals But now we find suddenly that if another world war comes we shall be killing one another as entire nations indeed, estimates of the survival-rate of mankind as a whole range from 25% to as low as 5% Faced with this prospect, for the first time in history the military experts themselves are actively and wholeheartedly in favour of peace

With this as a background 79 nations have ratified the principles of the World Health Organisation, the first being

> Health is a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity

A further principle of W H O specifically recognises the importance of training the child, and it was on this that Dr Chisholm based his address

TRAINING OF FUTURE CITIZENS

The adult population of the world today, he said, have all been educated to admire local loyalties, none of us has been specifically trained for life in this new world Here our parents' teaching is of no value to us, and we must teach our children in a new way Having taught them, we may find the new parent child relationship uncomfortable, for our children will be much wiser than we are But we must make that sacrifice if our children are to live in peace—that is, if they are to live to maturity at all

First we must teach our children tolerance, each nation has its sacred cows which seem ludicrous to other nations Our children must learn to tolerate them, however queer they appear Further, nations are developing at different rates, and development can be hastened but cannot be side stepped If we deplore, for example, the Russians' tendency to ignore the sanctity of human life, we should remember that it is only 120 years since small children in England were regarded as expendable items, essential to keeping chimneys clean We shall find that almost any behaviour that we now deplore in other nations was accepted as normal among our own people a few generations ago If we think some nations too complacent about their rate of progress, we should recall that every nation judges itself by what it used to be, not by what other nations are today

To acquire this tolerance every citizen would need a basic training in the following subjects

(1) *Social history*—the history of living conditions in other nations and the various methods adopted in changing them. British social history should be learnt from the history books of other countries as well as from British books, some familiar events will be scarcely recognisable in the foreign version

(2) *Psychology*, and enough psychopathology to explain the mechanism of such personal behaviour patterns as losing one's temper and resenting orders

(3) *Sociology*—how groups act and work, and how tensions arise between them, why groups have an urge towards self betterment, and how these urges are led astray down blind alleys

(4) *Great religions* of the world, and their influence on the behaviour patterns of nations

New techniques can be taught to under developed peoples. But such peoples adopt new ways not because they think them better than the old but because they like those who bring them. Here it is the personality of the teacher that carries most weight. Every country has standards of behaviour that it regards as obviously normal, though they may not be accepted elsewhere. The outsider seeking to introduce new ideas must recognise and respect the existing cultural standards concealing any sense of superiority he may have. Most countries are quite content with themselves as they are; and we must recognise that no cultural pattern has yet been shown to be the best possible for all nations. So any innovation must be regarded as still experimental.

In educating our children to face the complicated situation we must look on ourselves as failures. We have just fought a destructive war which each of us individually could have foreseen and recognised as disastrous. If we had exercised all our knowledge to the full we could have prevented it—but we didn t. Perhaps we can find an explanation in what is known about child behaviour.

DEVELOPMENT OF THE CHILD MIND

The newborn child has no sense of *time*. To become a satisfactory citizen he should acquire very early—before starting school—some sense of historical time and of geological time in the past. He should also grasp the concept of future time and be willing to forgo a small immediate pleasure in anticipation of a greater one later. By teen-age he should know what he wants to be when he grows up and how he intends to live ten years hence otherwise he will drift aimlessly into the first job that falls his way and live an unsatisfactory opportunist life. Through his sense of the future he should be able to appreciate that his acts may be no less valuable because their results will not appear during his lifetime.

The newborn child has no sense of *property*. He tries to engulf and absorb every new thing he meets, and make it part of himself. Some people never grow out of this infantile habit of grabbing everything for themselves but the satisfactory citizen can gain pleasure from the pleasure of other people and from things he does not possess himself.

The newborn child must be free to explore *space*—all objects and all areas within reach and within reason. The cause of much unhappiness in married people of today can be traced to their parents reprimanding them when they were one or two years old for exploring their genitalia. This is a natural and proper thing to do and our parents were wrong to teach us otherwise.

The newborn child eventually discovers his own *personality* and other people s. The child can develop a satisfactory personality on an astonishingly bare minimum of food and shelter but it must have a generous allowance of uncritical undifferentiated love. This has been established beyond any question young children require never failing and invariable friendliness from their parents. The child so equipped will grow up to expect a friendly reception from other people and will seldom be disappointed on those rare occasions he will recognise lack of friendliness as an abnormality an exception. But the child from whom love is withheld will tend to grow into a suspicious adult finding unfriendliness wherever he goes by interpreting neutral phrases and gestures as unfriendly he will encourage enmity from others.

If children are brought up on these lines there is hope for the future. By educating children correctly we can help them to develop into people able to live at peace in an organised world.

PUNISHMENT IN PENAL INSTITUTIONS

HOWARD LEAGUE MEETING

AT a meeting in London on Jan 17 under the auspices of the Howard League for Penal Reform punishment in penal institutions was discussed by Dr DESMOND CURRAN who was a member of the departmental committee which has lately reported on this subject,[1] and Dr T C N GIBBENS senior lecturer in forensic psychiatry at the Maudsley Hospital. The meeting was well attended and the debate was keen. It was evident that the report by the departmental committee had stimulated a great deal of interest but the general impression remained that the committee had failed to use their opportunities for removing outdated practices and for introducing far sighted and constructive measures of reform.

THE PSYCHIATRIST S RÔLE

Dr CURRAN, who was asked to answer questions based on the report disclaimed in his preliminary remarks any special knowledge of prison conditions, apart from his service on the committee. He thought that most psychiatrists talked a lot of nonsense about criminals because they usually saw only the psychiatric cases among them. He did not think that a psychiatrist was any better qualified than a layman to advise on discipline for the normal prisoner.

Dr GIBBENS admitted that psychiatrists might concentrate unduly on mental abnormality among criminals, but he asked whether there was not at any rate an abnormal response to punishment among a large proportion of offenders—otherwise they would never have landed in prison. Perhaps only 10% were definitely abnormal but a larger percentage might be somewhat abnormal especially of those who were repeatedly committed to prison. During his time as a prisoner-of war soldiers under detention on criminal charges were kept in the mental wing of a military hospital for lack of other accommodation and this arrangement seemed to answer very well. He wondered whether prisoners might not come to rely on a settled routine of punishments. Sometimes such a system was self perpetuating in mental hospitals for instance, if one took the bold plunge of not putting excited patients into padded rooms one found that such cases were far fewer. Might not reduction of punishment in penal institutions have a similar effect by lessening breaches of discipline?

DR. CURRAN did not think that the analogy between discipline in mental hospitals and prisons held good. For one thing the population of a mental hospital was not liable to unite in mutiny. Maidstone prison however had been run with hardly any punishments the one punishment was for the recalcitrant prisoner to be transferred to some other prison. One thing the committee had definitely recommended was better classification of prisoners, with removal of the tough guys —' tobacco barons, and so forth—to a separate prison and also a half hospital half prison for the mentally abnormal.

A DUAL SYSTEM

Dr GIBBENS felt that there was a discrepancy between some of the recommendations of the committee. They wanted a special institution half prison and half hospital to be set up for proper treatment of some 5% of adult prisoners and rather fewer of the borstal population and psychiatric centres to which boys and girls from approved schools and remand homes could go for proper classification and treatment yet they agreed to the present standards of punishment in prisons, urged that stricter discipline be applied in borstals, and advised fresh forms of punishment in approved schools Was it the expectation of the committee that the first set of recommendations, if implemented, would remove the need for the second, or were both to be applied together?

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[1] Report of a Committee to Review Punishments in Prisons Borstal Institutions Approved Schools and Remand Homes H.M. Stationery Office 1951 parts I and II Prisons and Borstal Institutions, see *Lancet* 1951 i, 1399 parts III and IV Approved Schools and Remand Homes see *Lancet* Jan 19 1952 p 141

Dr CURRAN thought that both would be applied together It was only the psychiatrically abnormal offender who would be dealt with as a medical responsibility He reiterated his view that the psychiatrist was not, qua psychiatrist, qualified to decide on matters of discipline for the normal offender A lot of attention was already paid to the mentally abnormal prisoner He instanced an old recidivist, whose crime was repeated arson, who when he committed breaches of prison discipline at Parkhurst used to be warded in the prison hospital

DISCIPLINE AT BORSTALS

Dr GIBBENS thought that the committee had not made clear whether the punishments in prisons and borstals were repeated punishments of a few individuals, or whether every prisoner tended to get up against discipline sooner or later The same applied to the abscondings from borstals, approved schools, and remand homes The lack of rigid discipline, the "free" atmosphere, and even some degree of absconding, which the committee had viewed with disapproval in the borstals, were, in the opinion of some observers, evidence of the advantages of those institutions

Dr CURRAN held that the discipline at borstals was too slack, and that a higher general standard of smartness could do no harm What had chiefly disturbed the committee had been the split in opinion between higher and lower grades of staff on the question of discipline The committee had advised the reintroduction of dietary punishment and a "closed" borstal because otherwise some boys just "called the bluff" about discipline and refused to work, and nothing could be done about them It had to be borne in mind that a lot of boys in borstals and approved schools were of low intelligence

OTHER VIEWS

In the general discussion Miss MARGERY FRY said that the report of the departmental committee was disappointing, for it was based on the naïve assumption that criminals thought of the future consequences of their behaviour unless people thought in this way most punishment had no deterrent effect The report took no account of the large incidence of low mentality in the criminal population The only real hope, therefore, of getting results from punishment would be that people feared it, but did people fear it enough? Did we, in fact, know whether punishment in itself had any effect at all?

Mr GEORGE BENSON, M P, criticised the committee for their acquiescence in the prevailing standards of punishment in prisons, which they did not regard as unduly severe He emphatically disagreed with this opinion In the report itself the records of punishments at various prisons showed that between one prison and another the weight of punishment varied amazingly This did not depend on the size of prison or the type of prisoner, for the weight of punishment at the two worst Scottish prisons was lower than that at any in England It all depended on the individual governor, he had known one excellent governor take over from an equally competent predecessor, reduce the weight of discipline to one fourth, and find that it made no difference to the incidence of disciplinary offences one way or the other He was also astonished at the way in which the committee had whitewashed prison punishments and gone on to make a savage attack on the discipline of borstals He pointed out that the average borstal punishment was far heavier than would be awarded to a prisoner of the same age in a prison

Dr J C PENTON asked what was the object of punishment in prison from the standpoint of the prison authorities, his own belief was that punishment was mainly meted out to maintain the morale of the prison staff

Dr GIBBENS agreed that the report was disappointing, for though it made some positive recommendations it also took several steps backwards The question of the efficacy of punishment remained unsolved Also, how were we to distinguish between the abnormal and the so called normal criminal? He himself thought it likely that offenders committing disciplinary offences in prison had an abnormal attitude to punishment He would hazard the opinion that the weight of punishment could be reduced without any loss of discipline With the psychopathic type of offender the half-prison, half-hospital institution might be the solution, he cited Springfield in the United States, where the authorities also retained Alcatraz as a place of segregation for the "tough guys." It was likely that a dual system of this sort would always be necessary Prisoners would sort themselves out into the two categories by their response to punishment, and he felt that it was impossible to diagnose the potential trouble-maker in advance He agreed with Dr Penton that one of the chief reasons for the imposition of punishment in prisons might be the maintenance of morale among the staff Prison was a closed system for the staff as well as for the prisoner

Dr CURRAN admitted that there were many imperfections in the present system, but the overcrowding of our prisons, the lack of trained staff, particularly in the prison medical service, and the lack of facilities for treatment and research had to be borne in mind The committee had made recommendations to try to remedy some of the defects, and the prison commissioners were of course well aware of such problems of overcrowding He felt that standards of punishment were bound to differ in prisons under different governors

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FEES FOR EXCEPTIONAL CONSULTATIONS

CONSULTANTS who have no contract with the hospital board of a region, but because of their unusual experience or interest are called upon to pay a special visit to one of the hospitals or clinics of that region, are paid 5 guineas for each visit The Staff Side of Committee B of the Medical Whitley Council has for some time been asking that this fee should be paid to consultants for occasional and exceptional consultations outside their normal duties whether they have a contract with the board or not

In putting forward this proposal the Staff Side has been concerned primarily with consultants in neurosurgery and in plastic and thoracic surgery Because consultants in these specialties are few, they are often in contract with a number of boards and are frequently called upon to travel long distances for a consultatio outside their normal duties, and yet they are ineligibl to receive a fee unless the consultation is outside th area of the regional board or boards with whom the are in contract In addition, these consultants, because of their scarcity, normally hold contracts for the maximum number of sessions, and they are therefore unable to adjust the number of sessions to overcome the difficulty

The Management Side has not felt able to agree to the proposal, on the grounds that it would infringe the principle that the consultant's contract must cover all duties to the board except domiciliary consultations. In the course of the negotiations, the Management Side indicated that, if any consultant in these specialties is overburdened, one solution would be for him to advise his regional board that he is unable properly to fulfil all the duties laid upon him, so that the board will have to consider an additional appointment

At its last meeting the Staff Side decided to call the attention of consultants in these specialties to the Management Side's statement.

COÖPERATION BETWEEN HEALTH SERVICE AUTHORITIES

SHEFFIELD SCHEME

THE question of how best to coördinate the three branches of the National Health Service is still undecided Meanwhile, however, Sheffield Regional Hospital Board has initiated the formation of medical coördination committees in the main hospital areas of the region These areas comprise (1) Sheffield and that portion of the West Riding which is within the Sheffield region (2) Derbyshire, (3) Nottinghamshire (4) Leicestershire and Rutland, (5) North Lincolnshire and (6) South Lincolnshire

The committees are constituted as follows:

Each local health authority within the area is represented by the medical officer of health.

Each hospital management committee within the area is represented by a consultant

Each local medical committee within the area is represented by two general practitioners

The largest committee is that for Sheffield and the West Riding with 21 members; the smallest, that for North Lincolnshire, has a membership of 8 only

The committees are purely advisory and members will be at liberty to take such steps as they think fit to bring the committee's recommendations to the notice of the bodies they represent At each meeting of a committee a medical officer of the regional hospital board is present

The inaugural meeting of each committee was convened by the regional hospital board and was attended by the senior administrative medical officer The first business of each meeting was to elect a chairman and secretary and to discuss the terms of reference The senior administrative medical officer referred to a number of problems affecting the relationship of the hospital the general practitioner and the local authority The following represent, in outline the main problems suggested for future discussion:

Hospital and General Practitioner

General

The employment of general practitioners in hospitals

Outpatient appointments; letters from hospital to practitioner after discharge of patients from hospital

Maternity

The extent to which beds for general practitioners should be provided in maternity hospitals.

Priorities for admission to maternity hospitals.

The antenatal supervision of cases booked for admission to hospital.

Chronic Sick

The care of patients in their own homes in coöperation with the hospital staff

Tuberculosis

The division of responsibility between general practitioner and consultant for patients awaiting admission to sanatoria.

The extent to which the consultant should supervise the domiciliary use of streptomycin.

Mental Health

Certification by general practitioners.

The relation of the general practitioner to the consultant in regard to domiciliary consultations

Notification to the general practitioner of patients who are discharged from mental hospitals.

Hospital and Local Authority

Maternity

Routine attendance at local-authority antenatal clinics of women who have booked at maternity hospitals.

The proportion of institutional confinements to be provided for

The criteria for admission to hospital and review by medical officers of health of requests for admission because of adverse social conditions.

The care of premature infants

Chronic Sick

The transfer from hospital of persons no longer in need of medical care to part 3 accommodation in institutions, hospitals or homes for the elderly

The establishment of the closest contact with general practitioners in regard to facilities for the home care of the elderly sick

The coördination of hospital and local-authority medico social services

Tuberculosis

Assistance in rehousing

Provision of home helps and nurses to assist general practitioners in domiciliary treatment

Problems of isolation arising from B C G vaccination

Mental Health

The use of psychiatric social workers and mental health visitors in helping general practitioners with early mental cases

The relation of the consultant to the duly authorised officer of the local authority

Public Health

The School child's Health

THE inception of the National Health Service in July 1948 dislocated the school health service in only one important respect—namely, the partial collapse of the dental service through the resignation of dentists who preferred to practise under the N H S In his report for the years 1948 and 1949,[1] Sir John Charles chief medical officer of the Ministry of Education remarks that most school medical officers seem to have found that the changes in administration were made smoothly and that their work was little disturbed Liaison with hospitals developed satisfactorily, although "it is not always realised by the hospital management committees that the school medical officers have the machinery to put into operation after-care in whatever form it may be recommended With free medical care now available to all under the National Health Service there is special need for close and harmonious understanding between the school medical officer and the family doctor in order to avoid duplication, in some areas this has been achieved by the school medical officer holding conferences with the general practitioners.

DENTAL SERVICE

Whereas at the end of 1947 the number of dentists in the school service was equivalent to 921 full time officers, at the end of 1949 the corresponding number was 732 The report goes on to urge that dentists in the school service should not preoccupy themselves with filling deciduous teeth

For some time there has been an increasing tendency to advocate extensive conservation of the temporary teeth for orthodontic reasons It is argued by a section of the dental profession that multiple deciduous extractions lead to serious irregularities of the permanent teeth in a substantial proportion of cases This proposition does not command universal acceptance but even if it did there would still be a simple question calling for an answer It is this—is the conservation of a child's temporary teeth for a few years at most together with the avoidance of a conjectural irregularity of the permanent dentition more important than the certain loss of another child's permanent teeth (or viewed from another aspect the same child's permanent teeth a few years later)?

MEDICAL INSPECTION

School medical officers and assistant school medical officers in the service of local education authorities in England and Wales numbered 1650 in 1948 and 1855 in 1949 The total time given by these doctors to the school health service was equivalent to the full time service of 832 doctors in 1948 and of 801 in 1949 when there was a ratio of 1 doctor to every 6121 children.

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[1] The Health of the School Child Report of the Chief Medical Officer of the Ministry of Education for the Years 1948 and 1949 H.M. Stationery Office Pp 92 3s

During each of these years probably more than half the children on the registers were medically inspected

In 1949 8% of all children on the school registers were found to be verminous Figures for each year since 1934, included in the report, show little tendency for the incidence of infestation to decrease "These figures are profoundly disappointing It is quite true that many slight infestations which escaped record fifteen years ago would not do so to-day, but acceptance of that as a complete and satisfying explanation of the figures here given savours of wishful thinking"

TONSILLECTOMY

The number of tonsillectomies carried out on pupils has fluctuated widely from year to year In 1948 the total of 96,262 was the greatest since the peak year of 1931, and has been exceeded on only three occasions—in 1929, 1930, and 1931 "It may safely be assumed that one reason for the high number was the serious and widespread epidemic of poliomyelitis in 1947 This caused a postponement of operation, which would otherwise have been carried out in 1947"

The report cites a study by Glover which showed that the number of tonsillectomies has differed widely between one area and another "Thus in 1948, a child in Birmingham was more than four times more likely to be tonsillectomised than one in Manchester, and, while Bristol in 1948 trebled her pre-war rate, Leeds reduced hers to one fifth"[2]

OTHER ASPECTS

The report includes essays on the diabetic child, on child guidance, and on the prevention of tuberculosis

From the first of these we learn that in England and Wales between 30 and 50 children under the age of 15 years still die from diabetes every year This "is *a strong argument in favour of hostels for the minority* of diabetic children whose supervision at home is unsatisfactory"

The review of child guidance ends with the following comment

"It is regrettable that psychiatric and psychological reports are frequently couched in terms which are quite unintelligible to a layman, and indeed are sometimes incomprehensible even to medical colleagues *If the reports are* obscurely phrased, it is suggested that the school medical officer should discuss the matter in an informal and friendly way with his colleague who has written the report The *removal in this way of possible misunderstanding* will do much to prevent that disrepute of child guidance which results from the use of incomprehensible jargon"

With regard to the prevention of tuberculosis, 341,727 school-leavers have been examined by mass radiography since the first unit was put into operation in October, 1943 The findings have been

Active primary tuberculosis	154
Active post primary tuberculosis	318
Tuberculosis—pleural effusion	51
Benign intrathoracic neoplasms	14

SCHOOL MEALS

The number of pupils taking school dinners rose from 2,500,000 (52 3%) in February, 1948, to 2,851,000 (53 2%) in October, 1949

"The past ten years have seen not only a great increase in the number of children taking meals at school, but the development of the service out of all recognition Between 1939 and 1949 the school meals service multiplied roughly seventeen times This in itself was an achievement, but equally significant is the change which has taken place in the character of the service during that period Generally speaking, the 'feeding centre has given place to the 'school canteen,' and even where the change has not as yet become complete there is ground for optimism, because what is considered a good standard for a school meal has been recognised and, in time the good will oust the bad"

The percentage of children taking school milk was 88 in February, 1949 and 86 9 in October, 1949 By the end of 1949 over 98% of all milk distributed under the scheme was pasteurised or tuberculin-tested

Old People Living at Home

Suggestions for improving the welfare arrangements for old people are made in a circular issued by the Department of Health for Scotland There are three main points

(1) To minimise the danger of neglect of old people living alone, *the name and address of the person to whom cases* needing attention can be reported should be published locally In some areas a register of such cases is kept, and this practice should be adopted generally

(2) A meal service for old people who find difficulty in preparing sufficient food for their proper nourishment should be available in all districts

(3) Responsibility for deciding whether a particular old person, who cannot be looked after at home, should be admitted to a hospital or to local authority accommodation must be accepted by either the local authority or the hospital authority Doubts about the position in such a case have arisen in the past, probably because of the shortage of both hospital and residential accommodation.

A separate memorandum deals with the meal service, which, it is suggested, should be provided by voluntary effort supported by local authorities A minimum charge of *9d* for a normal meal should be made, the National Assistance Board will help an old person whose lack of means otherwise brings him within its scope and who might be unable to pay this charge It is emphasised that the object of the service is not to augment the resources of the old people, but to ensure that they get enough properly cooked food

There will always be some old people, says the circular, who wish to be left entirely alone, and under any system there will be danger of such people being found eventually in serious distress But everything possible must be done to allow them to preserve their independence and yet keep fit

Guidance on Design of Houses

Houses, 1952,[1] a new supplement to the *Housing Manual, 1949*, contains plans of the type of house which the Minister of Housing and Local Government would like local authorities to build this year in order *(a)* to get more houses from the limited resources, and *(b)* to reduce capital costs and rents

The main rooms in plans illustrated in this booklet are as large as those recommended by the Dudley Committee, but savings are made in the total superficial area by careful designing, notably of passage space, storage space, and access from front to back of the house. Various ways of achieving essential standards are described, including "dining-hall" and "large living-room" houses These types are an innovation in houses of this size in Britain

The introduction to the booklet says

"To show the present saving by adopting these designs it has been estimated that a house in Groups I or II would cost at least £150 less than the average house being built at the present time, and this would mean a saving in rent of 2*s* 5*d* per week The capital saving should be more in the case of the three bedroom house and rather less for the two bedroom house, there would also be price variations in *the different regions For instance, one council in the Midlands* has already (December, 1951) built a pair of three bedroom houses to similar economical designs at a cost of under £1000 each—terrace blocks should show a greater saving The average cost of three bedroom council houses completed in this part of the country was then about £1400 This saving of about £400 means 6*s* 6*d* a week less rent"

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[1] H M Stationery Office 1*s*

[2] Glover J A *Bull Min Hlth P H L S* 1950 9, 62

" it is to me a sobering thought that almost the two biggest *items of expenditure by the local* health authority is in relation to the Home Help Service and to the Hospital Car Service, both desirable, perhaps both necessary, but equally both far removed from what one would term the field of positive health work '—Dr HENRY ROGER, medical officer of health for East Suffolk, in his report for 1950

In England Now

A Running Commentary by Peripatetic Correspondents

At the small mission hospital we had seen many interesting and difficult cases. The American doctor now had an evangelical engagement, and as yet there had been no time to talk. So we agreed to meet the doctor and his wife for dinner at the one reputable restaurant in the small railway town, run by a Chinaman. We were late starting our meal; the Chinese dishes were numerous and excellent: both the doctor and his wife expounded their own peculiar theological dogma with eloquence and conviction: the doctor was very knowledgeable about both clinical and preventive medicine. It was good conversation and we were the last in the restaurant. The owner was ready to put up his shutters. I got up and asked for our bill. But there was no bill. A Chinese patient had been feeding at a nearby table and seeing the doctor dining out with his wife and European friends had quietly settled our reckoning and left without a word.

* * *

I have been reading some old half forgotten classics among them the *Memoirs of Baron de Marbot*. The Baron had been a lieutenant in Napoleon's guard at the battle of Austerlitz, in 1805 where General Morland, his commanding officer was killed. Napoleon decided that the general's body should be placed in the mausoleum he proposed to build on the Esplanade des Invalides, in Paris. There was neither time nor means for embalming it, so the surgeons sent the body to Paris in a barrel of rum. What with one thing and another the mausoleum still was not built and the barrel of rum was still standing untouched in the *École médicale* when Napoleon abdicated in 1814. Eventually it burst from sheer senile decay, and—*tiens!* the general was still in a perfect state of preservation. But *parbleu!* his moustaches! Believe it or not, they had grown and grown until they now reached below his waist.

Before they could take the general's body away his family had to fight a legal action "against some scientific man who had made a curiosity of it." Marbot's comment is "Cultivate the love of glory and go and get killed, to let some oaf of a naturalist set you up in his library between a rhinoceros horn and a stuffed crocodile!"

Oafish it may be but one cannot help wondering whether the general was so full of androgens when he died that they went on acting for years or whether rum stimulates the suprarenal cortex so powerfully that it can still be effective after death. If rum really acts like this, perhaps it explains why barbers recommend bay rum for bald spots; and even why the Navy grow beards.

* * *

I wonder whether our chiefs, the great and mighty get as much secret amusement out of their students as we get from them. There was that assistant surgeon who announced at the bedside that "This woman came to hospital with a lump in her abdomen the size of my head—and that's saying something" and looked blankly at his registrar and students when they had obvious difficulty in controlling their smiles.

One very senior physician a kindly man though a hard taskmaster had allowed his attention to wander while his ward-clerk was reading out the history of a woman with bilateral mid thigh amputations. At the end he returned from his day-dream with a start to ask: "Is there any swelling of her ankles?" and got the reply: "No Sir, she hasn't any." He was going on to inquire after her knee joints, but we managed to whisper in his ear that it was ankles that she hadn't got. Next week he was teaching on a hæmophiliac boy with hæmorrhages into both ankle joints. The past history had been read and the great man was looking at the clerk's report on the family when suddenly he looked up and asked: "What's all this about his uncles being swollen in bed?"

* * *

On the whole my sympathies are with the lay administrators of the N.H.S. hospital—it is easy to gibe at them but they carry a fair measure of responsibility. My feelings have however, been rather less kindly since my recent experience over the appointment of a new registrar for our non-teaching hospital. In the bad old days my colleagues and I would have seen the candidates selected for interview either before or after dinner at the end of our day's work. Under the new dispensation only one surgeon had a voice in the selection, and he had to leave his hospital outpatient session in the middle of the afternoon and go to the headquarters of the regional board.

The candidates appeared before nine people (1) a lay member of the regional board (2) the deputy medical administrative officer, (3 and 4) two lay clerks; (5 and 6) the chairman and a lay member of the hospital management committee, (7) the regional postgraduate adviser; (8) an outside surgeon, and (9) myself the only man who would be working with the successful candidate. The committee generously left the choice to me—a welcome decision which presented no difficulty because my colleagues had told me their views beforehand. The other eight gentlemen present could have been doing something better in the middle of the afternoon. I certainly could. There were my outpatients to see.

* * *

There is something to be said for opening one's *Lancet* at the advertisement columns as I usually do. Lately, for instance my eye was caught by this opening-day's programme of a course of lectures

Rest
Movement
Lunch.
Manipulation

I could see that the members of the "course" having struggled strap-hanging to reach the appointed place by the starting time of 10 A.M. will have earned a rest. And it was clear that this must sooner or later be followed by movement. But on what lines? Music and movement? Up in the morning early? Or a modern version of square-bashing? Whatever the form of their movement, its direction would be towards lunch (included in the fee for the course) which would be followed by manipulation. Of what and by whom? Having partaken well if not too wisely, do the assembled members manipulate each other's limbs; or does this merely imply some manipulatory replacement of their respective dentures (part State-aided) necessitated by an overenergetic repast? Does the lecturer manipulate them or they him, or—but these are enough questions to be going on with.

* * *

One of many interesting things about the South Shetlanders is their sparing use of hard liquor. This abstinence nowadays springs not so much from any deep politico-religious conviction as from the fact that they just don't need the stuff. Unlike many of us puir Sassenachs they require nothing to take the edge off their simple, sensible and well-ordered lives. South of Lerwick there are two hotels, friendly and hospitable but oh so dry and the village pothouse is conspicuously absent.

There are no pubs in Scousburgh
  —I merely state the fact—
No licensed inn that is within
  The meaning of the Act.
There are no pubs in Scousburgh
  —A fact that none can blink—
To Scalloway or Lerwick they
  Must go who want a drink.
There are no pubs in Scousburgh
  The thirsty soul will find
No pubs at all in Scousburgh—
  (Repeat) No pubs in Scousburgh—
Not one damn pub in Scousburgh,
  And no-one seems to mind.

* * *

In the Clinic the other day we had one of those children who bang their heads on the pillow. This one varied the orthodox symptom by saying "Whirr whirr" as he banged. David reminded us of an article in the *J. ment. Sci.* that said it was all due to the child's attempt to regress to the experience of Mum's apex beat which was associated with suckling. Alan was sceptical. "Why the whirr whirr?" he asked. David eyed him coldly and replied: "Mother has mitral stenosis, of course."

Letters to the Editor

THE TREATMENT OF PEPTIC ULCER

SIR,—I enjoyed reading Dr Todd's critical article last week I wonder, nevertheless, whether he may not have carried his nihilism too far Psychotherapy for duodenal ulcer is admittedly disappointing I have had great help from certain psychiatrists in gaining an understanding of the mental attitude of patients, but never in the production of cure On the other hand, I have notes of sufferers from chronic ulceration who have been completely free from symptoms for 8 to 10 years after embracing some faith which takes the burden of responsibility and anxiety from their shoulders

Dr Todd's most contentious implication is that rest in bed is unnecessary because it is probably of no value, but that it certainly may be harmful owing to its disorganising the patient's life He calls for a large controlled series with long follow-up to justify bed rest Admittedly no such series is available, but time after time we meet with statements from patients which force us to the conclusion that prolonged rest in bed is not just a thoughtless perpetuation of ancient therapeutics Quite apart from the rapid disappearance of *uncomplicated* ulcer pain once a patient has been put to bed, a more suggestive history is given by most men with chronic ulcer It is that after, say, 5 years of indigestion, recurring at shorter intervals and lasting longer each time, his doctor insists that in addition to having orthodox ambulatory regimen the patient should be up for 5 weeks After this period the sufferer is free from symptoms for 2 to 5 years Does not this suggest that healing took place as the result of rest? To compare sedentary workers with patients in bed is unsound There is a world of difference between the position of the stomach, and thus the concentration of acid at different levels, in a sitting and lying posture

On the matter of diet, surely the direction that meals shall be small is not given in the belief that a full repast will be harmful, but that such a meal will deprive the patient of appetite and he will be disinclined to take the extra meals which, we are all agreed, are essential I agree with Dr Todd that a good deal of nonsense is talked about roughage irritating an ulcer It is difficult to believe that a piece of lettuce lying on an ulcer will do more than protect it from acid! Some argue that pips, skins, &c, may induce pyloric or duodenal spasm and pain This is difficult to disprove There can, however, be no argument about the harm from spices Mustard, pepper, and pickles, for instance, are violently irritant to mucous and denuded surfaces, and this is demonstrable gastroscopically Alcohol is also irritant if sufficiently concentrated I agree with Dr Todd in allowing wine and beer, but spirits so often taken when the stomach is empty, must surely represent a great risk of damage

As to tobacco, the immediate aggravation of symptoms, during an active phase, by smoking is too well known to need emphasis Although this effect is not necessarily a sign that ulcer healing is retarded, it does not seem an unreasonable assumption We know that nicotine stimulates the vagal ganglia in the stomach and duodenum, and causes increased tone and peristalsis and often increased acid output This is why some of us advise cessation of smoking, or smoking only when the stomach is fully protected by food

Physicians realise that it is the relapse which is a standing reproach to their efforts There is also general agreement that if gastric acidity can be profoundly depressed over the greater part of the 24 hours these relapses will not occur This goal we are approaching, but gr 15 (1 g) aluminium hydroxide hourly will not bring us much nearer During the last year I have been testing various antacids on gastric acidity, and am satisfied that constant sucking of a suitable tablet will provide us with the answer The tablets of aluminium hydroxide have to be taken every 5 minutes to be effective, complete escape from neutralising action is seen within 15 minutes of the last dose

London, W 1 A H DOUTHWAITE

SIR,—In his article last week Dr Todd places a low value upon psychotherapy in the treatment of peptic ulcer and perhaps those of us who place a high value on it have ourselves to blame for this, in that we have not formulated our views and made them public

In his article he tacitly assumes that gastric ulcer and duodenal ulcer are similar disorders and behave in the same way, I believe this to be incorrect—they are distinct disorders and have different determinants The causation of gastric ulcer is in doubt, but duodenal ulcer is a stress disorder, its "natural history" is determined by stress, and anxiety is by far the most important variable in the causal complex The sources of anxiety may not be immediately manifest to the patient or to the doctor who is treating him, and indeed much laborious exploration may be needed before they are made plain.

I agree with Dr Todd that it may be difficult to influence the patient's emotional state or the inner disharmony of which it is a sign, but it is surely worth while to tackle this primary problem with all the resources we can bring to bear, especially when the patient is young and his ulcer recent The principal limitations on treatment are time and the patient's intelligence and adaptability If the patient can make use of the insight he gains in therapy, he can not only get better but stay well Time is the greatest obstacle, I have found that the longer the time that can be spent on treatment the greater is the benefit Psychotherapy does not end with reassurance, as Dr Todd's account of it implies, it begins there, but doctor and patient have a long and steep road to climb together after that

For the duodenal ulcer patient rest is not always sound treatment, and I have given elsewhere the case-record of a patient in whom rest, with its attendant frustration, produced vomiting[1] Dr Todd is right to draw attention to the dangers of rest, and he might have gone further still, it is not the remedy itself, but its meaning to the patient, which matters All of the multitude of remedies suggested for duodenal ulcer have proved useful in some cases and failed in others The decisive factor, in the end, is a psychological one Individual therapy for every patient is an ideal, short of this, group therapy may be the key

London, W 2 DESMOND O'NEILL

HYSTEROSALPINGOGRAPHY IN FEMALE INFERTILITY

SIR,—In his interesting article of Jan 5 Dr Freeth refers to the importance of uterotubal spasm and expresses surprise that in 13 cases in his series the fallopian tubes were shown radiologically to be patent after insufflation had suggested that they were blocked He refers to a paper of mine[2] and claims that I reported an incidence of tubal blockage of 21 6%

As this paper recorded the results of a considerable research and was probably the first to challenge the commonly accepted views of tubal occlusion, I trust that Dr Freeth will pardon me for pointing out that his reference to the paper was incomplete and for that reason inaccurate The correct version, which supports Dr Freeth's own conclusions, states

> "The incidence of *apparent* blockage is 21 6 per cent The corrected figure, however, is 12 8 per cent, and an analysis of the last 171 patients in the 1,000 studied revealed that the

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[1] A Psychiatric View of Digestive Disorder *In* Modern Trends in Gastroenterology, ed F Avery Jones (In the press)

[2] *J Obstet Gynæc* 1918, 55, 171

apparent blockage was again 21 per cent but the corrected figure was 9 per cent As a result of our experience at Oxford we now go further and state that we believe that even this figure is too high and that with the improved methods of nvestigation the incidence of tubal occlusion will be found o be less than the 9 to 12 per cent given above The vidence presented has established the fact previously unsus ected that uterine irritability is the most common cause of ibal occlusion, and in the past has been responsible for an ror of at least 100 per cent when estimating tubal blockage'

Radcliffe Infirmary Oxford　　JOHN STALLWORTHY

SIR,—I am very interested in Dr Dalley's comments (Jan 12) on the frequency of after pain following hysterosalpingography with 'Viskiosol Six' I think it likely that he has overcome this undesirable sequel by using a smaller quantity than his more junior colleagues

In this connection I should like to stress the value of X ray screen examination during this procedure whenever this is possible The experienced radiologist can nearly always be certain that free spill is or is not occurring from one or both tubes as the injection proceeds By means of screen control excessive soiling of the peritoneum with what is after all a foreign substance can be prevented. For the injection of an arbitrary amount to be uniformly successful as Dr Freeth in his paper claims, the quantity selected must be prejudged large enough to suit every case

In the experience of my department the use of quantities of viskiosol six in excess of the amount required for the examination is followed by after pain which may be quite severe When viskiosol six is used with restraint the information obtained is just as reliable as that obtained with 'Lipiodol, without the unpleasant persistence of the latter and I have no doubt of its value

Central Middlesex Hospital,
London N W 10

F PYGOTT
Radiologist.

AUTOSENSITISATION IN SKIN DISEASES

SIR,—With reference to your annotation of Jan. 12, it may be of interest to mention 3 cases of disseminated lupus erythematosus with positive direct Coombs tests seen during the past year

In the 1st of these there had recently developed a severe hæmolytic anæmia but the Coombs test became negative after cortisone therapy In the 2nd patient the Coombs test became negative after treatment with A.C.T.H but has since become positive again at no time has this patient had evidence of increased red cell destruction, and there has been no anæmia leucopenia, or thrombocytopenia In the 3rd case also treated with A.C.T.H., the positive Coombs test became negative but a moderate non hæmolytic anæmia has persisted These cases will later be reported in detail.

In addition to the cases reported by Marshall and others[1] Dubois[2] has recently described 3 patients with acquired hæmolytic anæmia with a positive direct Coombs test who subsequently developed frank disseminated lupus erythematosus In a study of the hæmatological aspects of systemic lupus erythematosus Michael and others[3] found a positive direct Coombs test in 25% of those tested and describe 3 instances of hæmolytic anæmia in 1 of which the Coombs test was positive. Wintrobe and others[4] have also described a case of hæmolytic anæmia associated with lupus erythematosus.

Further study of red-cell auto antibodies in the collagen vascular diseases may help to elucidate the pathogenic processes in these diseases and will certainly make for a better understanding of the significance of a positive Coombs test Already it is clear that the red-cell adsorbed antibody is not by itself invariably associated with increased hæmolysis Nor is it identical with the plasma factor responsible for the L E phenomenon[2]

The occurrence of anæmia leucopenia, and thrombocytopenia with or without autosensitisation in a disease in which a splenic lesion is almost invariably found at autopsy raises the question of the possible rôle of the spleen in producing these cytopenias Few will accept unreservedly the suggestion of Dubois that this is an example of "secondary hypersplenism" The concept of hypersplenism of Doan and his colleagues is of an abnormal spleen hyperactive in destroying cells produced at a normal or accelerated rate The hypothesis of Dameshek and Estren is of an abnormal spleen depressing cell maturation and release The hæmatological changes in lupus erythematosus provide an opportunity for the critical examination of these hypotheses and for their possible conciliation

Department of Medicine
University of Glasgow

A. G BAIKIE

CORTISONE IN RHEUMATIC FEVER

SIR —In your leading article of Dec 29 you remark that there is, as yet, 'no evidence that the immediate mortality of rheumatic fever is reduced by treatment with cortisone" The story of a patient who has been for some time past in the Bristol Royal Infirmary under the care of Dr H J Orr Ewing seems to show that cortisone may in fact save life during a crisis of acute rheumatism

On May 30 1951, this patient a girl aged 17 was admitted in extremis, to the Bristol Royal Infirmary She was said to have had rheumatic fever at the age of 7 In February 1951 she had developed the manifestations of acute rheumatism. From March onwards she had been treated with salicylates in a dosage of up to gr 180 daily She had also been given sulphadimidine and 'Phenergan' No therapy had brought the slightest benefit

When admitted she was pyrexial her temperature swinging in the region of 101 F The sleeping pulse rate was 120 per min There was erythema multiforme over the trunk and severe pain and swelling in both ankles and knees Large classical rheumatic nodules had appeared on the back of the occiput on both elbows, on the knees, and on the dorsum of the right foot She was in congestive failure with filling of the neck veins and œdema of the sacrum and legs The heaving apex beat was visible in the 6th space and anterior axillary line A pericardial rub was audible widely over the precordium At the apex an accentuated first sound was accompanied by a systolic thrill and grade 3 murmur A soft blowing diastolic murmur could be heard to the left of the sternum There were diffuse moist sounds in the lungs She had lost 2½ stone in weight

Chest radiography revealed gross enlargement of the cardiac shadow with pulmonary congestion and collapse of the left lower lobe Electrocardiography showed early changes of pericarditis and a lengthening of the Q–T interval The erythrocyte-sedimentation rate (E.S.R.) was 53 mm. in 1 hr hæmoglobin 73%

On the night of admission she developed the appearances of circulatory failure with a fall in blood pressure feeble rapid pulse clammy ashen grey skin and Cheyne Stokes breathing She seemed in fact unlikely to live through the night

She was put on cortisone in a dosage of 200 mg intramuscularly night and morning for 3 days followed by 100 mg night and morning for a further 5 days and subsequently 50 mg twice daily Routine treatment of absolute rest salt restriction and digitalis was continued

There was an immediate response The patient felt and looked better Within 4 days she had become apyrexial for the first time for many weeks and her pulse rate had fallen to 100 per min Her appetite improved Her weight rose by 5 lb in a fortnight The pericardial rub disappeared The diastolic murmur became less evident The Q–T interval became normal while the electrocardiographic changes of pericarditis disappeared The cardiac shadow diminished greatly in size and the E.S.R. dropped to 12 mm. in 1 hr

After a fortnight the cortisone dosage was reduced to 25 mg twice daily A week later she experienced a sharp setback. Her temperature rose to over 100 F and the pulse rate to 140 per min There was a return of Cheyne Stokes breathing The heart shadow again increased in size She was put back on cortisone, 100 mg twice a day Within 3 days the temperature was again normal and the pulse below 100 per min

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[1] Marshall, J Zoutendyk, A Gear J S Afr med J 1951 25 161
[2] Dubois, E L J clin Invest 1951 30, 636
[3] Michael, S R, Vural I L, Bassen F A Schaefer L. Blood 1951 6 1059
[4] Wintrobe M M Cartwright, G E, Palmer J G Kuhns W J Samuels, L T Arch intern Med 1951 88 310

Steady improvement continued The diastolic murmur now disappeared The nodules became smaller Once more the cortisone was gradually diminished After a further 8 weeks it had again been cut down to 25 mg twice a day, given now in conjunction with salicylates A few days later her temperature started to rise, and the pulse rate, which had become steady at about 70 per min, returned to 125 She became much more ill On increasing the dosage of cortisone to 50 mg twice daily there became evident the same *immediately beneficial effect as before*

In October an attempt was made to get the patient up This, however proved premature and led to another setback One further attempt, in early December, to reduce the cortisone dosage to 25 mg twice daily met with the same result as previously She has since remained stabilised on 50 mg twice a day by mouth. While receiving more than this she had developed some toxic reactions, including "moon face," abdominal striæ, and acne These manifestations soon disappeared

The patient has now been on cortisone for a total of 31 weeks In every way she is immensely better She is afebrile, and her pulse is steady at 75–85 per min The joints are painless and fully mobile There is nothing to suggest gross valvular damage The heart size has, in fact, returned almost to normal A grade 3 systolic murmur persists at the apex.

Here, then, is a patient of whom indeed it may be claimed that her life has been saved in the acute phase of rheumatic fever by treatment with cortisone Obviously, however, a new problem has been raised A few patients like this would soon drain the country of its supply The identification of acute rheumatism, it is now realised, is less simple than has been supposed Indeed, many would take exception to the statement in your article that "rheumatic fever is a self limiting disease, attacks of which usually last for six to nine weeks" This girl has evidently been in an acute phase already for nearly a year When is it going to prove possible to wean her from her cortisone treatment?

Royal Infirmary, Bristol I McD G STEWART

BLOOD-GROUPS AND SEX-RATIO

SIR,—There are several objections to Dr Allan's comparison (Jan 12) of the data compiled by Waterhouse and Hogben[1] with the data recently reported by me[2] He compares the average number of living children in the various ABO mating types in the one set of data with the sex-ratio at birth in the ABO mother infant combinations (by pooling the Bombay and New York data) in the other It does not seem to be necessary to deal here with these objections, including some errors in Dr Allan's calculations I would, however, like to point out some reservations I have to the data compiled by Waterhouse and Hogben, which form the basis of Dr Allan's calculations

Hirszfeld[3] first suggested that the fœtus in utero could be lethally affected if the mother carried the antibodies that were not compatible with the blood group of the fœtus He observed that the frequency of A children is lower in matings of the type A♂ × O♀ compared with matings of the type O♂ × A♀ This idea was given up by Hirszfeld[4] himself, but was revived by Levine[5] and Waterhouse and Hogben The data compiled by Waterhouse and Hogben consist of 1239 families with 4139 children from twelve heredity studies selected from literature on the basis of several criteria The authors claim to demonstrate a deficiency of the number of families and a deficiency of the number of children in such families in the mating type A♂ × O♀ when compared with the mating type O♂ × A♀ An extensive material compiled by Hirszfeld,[6] of 3786 families with 9897 children from twenty-seven heredity studies, does not support this observation, it affords evidence for the contrary view It also invalidates Dr Allan's pattern of "fertility" figures

Tata Memorial Hospital,
Bombay, India L D SANGHVI.

THE RATIONAL TREATMENT OF CATARRH

SIR,—In your review, last week, of my book your main criticism is that I have not described the various varieties of catarrh May I indicate that this book is written about treatment and not diagnosis, which is fully described in all textbooks of laryngology.

It should be clearly understood that sufferers from chronic nasal catarrh and sinusitis present themselves for treatment to the practitioner of physical medicine when all other methods of treatment by laryngologists have failed

Eastbourne W ANNANDALE TROUP

BOVINE TUBERCULOSIS PREVENTS HUMAN TUBERCULOSIS?

SIR,—In his letter of Dec 8, Dr Nisbet says that my figures (Oct 27) "suggest that in areas where the milk has been largely freed from tubercle bacilli the notifications of pulmonary tuberculosis have increased"

I should like to point out that my belief, based entirely on figures, is that the substance I have called "tuberculin," which is the secretion or excretion or both of the bacillus, is the product in milk from cows infected with the tubercle bacillus which, when ingested by man, increases resistance to the human type of bacillus In my experience, infection of the milk by the bacillus is fairly rare In 1925 no cattle were tuberculin tested on the Island of Jersey and 9 individuals were certified as infected with tuberculosis and admitted to hospital, whereas by 1948, after ten years of complete attestation on the island, the figure had risen to 77 It can be fairly safely assumed that the bovine tubercle organism has been absent from the cattle and tuberculin from the milk, and that this change has coincided with this enormous increase in human infection

In 1920 Denmark had no tuberculin tested cattle and the yearly average of notifications of pulmonary tuberculosis for 1920–24 was 3073 In 1947, 95% of the total cattle population was tuberculin-tested, and the yearly average notifications for 1943–47 had risen to 3559

Dr Nisbet further states "One would also like to know that the total notifications are correct" I have sent all of the figures to the medical officers of health concerned, and none have reported any inaccuracy

Quoting Francis[7] "As milk is freed from tubercle bacilli by the eradication of tuberculosis from cattle, more will have to be done to protect adolescents from infection by B C G vaccination" It seems fairly futile to go on with the attested cattle scheme when no reliable vaccination method is available to supply artificially what Nature—to use a colloquialism—has supplied for us.

High Wycombe, Bucks L PITCHER

***In publishing Mr Pitcher's letter of Oct 27 we persuaded him to omit his data for Jersey and Denmark We now make amends by publishing this supplementary letter But we do not ourselves find this part of the evidence convincing, and we certainly do not agree with Mr Pitcher about the futility of going on with the attested cattle scheme —ED L

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[1] Waterhouse J A H Hogben L *Brit J soc Med* 1947, 1 1
[2] Sanghvi L D *Nature Lond* 1951 168 1077
[3] Hirszfeld L Konstitutionsserologie und Blutgruppenforschung Berlin 1928
[4] Hirszfeld L Les Groupes Sanguines Paris 1938
[5] Levine P *J Hered* 1943 34 71
[6] Hirszfeld, L *Ergebn Hyg Bakt* 1934, 15, 54
[7] Francis J *Lancet*, 1950, i, 34

THE SENIOR REGISTRAR

SIR,—I should like to comment on the article (Jan 12) by the consultant staff of Northampton General Hospital

It is my belief that the root of the trouble lies in action taken at and since the end of the late war First it was stated that there would be a large expansion in consultant services when the new health service came into being and grants were awarded wholesale to would be specialists in training It is now stated that in its present economic plight the country cannot afford to support the increased number of consultants and hundreds of highly trained men many of them State-sponsored, face professional extinction

Many registrars of senior grade are now approaching the age of 40 *During their long years of training they* have acquired families and other responsibilities, and their situation is serious As the State is largely responsible for this, action must be taken by it through the Ministry of Health without further delay

Apart from full consultants and senior hospital medical officers the whole of the hospital staffs of this country are employed on a temporary basis In what other profession would such a state of affairs be tolerated ?

Of the various possible solutions the ideal one of course, *is to increase* the consultant establishment now as suggested by the Northampton consultants The cost to the country would be small compared with expenditure in other directions The work is there to be done; at the moment it is being carried out by consultants *many* of whom are *over-employed* and by senior registrars, not a few of whom are being used as full consultants with full charge of outpatient clinics and of hospital beds.

As a compromise solution the formation of a grade of assistant physician or surgeon would *I think* be acceptable to a majority of registrars for it would give security of tenure and should not prejudice the future advancement of one so graded The main danger is that such assistants might be used as a form of cheap labour

The suggestion that registrars should be interchangeable between teaching and non teaching hospitals is a good one. Nevertheless I doubt whether there are enough teaching hospital posts to accommodate all registrars from non teaching hospitals Teaching hospital consultants would get to know many of the registrars from non teaching hospitals, which is a very important factor when the registrars ultimately apply for consultant posts. Such personal knowledge of the candidate accounts for many teaching hospital registrars obtaining consultant appointments in the face of stiff opposition from more senior and usually more experienced men from the non teaching hospitals

The use of general practitioner clinical assistants in hospitals to replace registrars is another impracticable suggestion If there was formerly enough work for a full-time registrar the general practitioner would have to devote much of his time to hospital work to the detriment of his practice If the work were to be shared between several general practitioners this would be uneconomical, for few practitioners would do the work for the registrars present rate of pay

In this matter I have no personal axe to grind as I have yet to enter the lists for a consultant appointment but unless action is taken very soon I too shall be reduced to the same desperate straits that already encompass many more senior and worthy men

Southlands Hospital
Shoreham by-Sea.

D O WILLIAMS
Senior Surgical Registrar

SIR,—As a senior registrar nearing the end of my 3rd year I was glad to read the article by the consultant staff of the Northampton General Hospital in your issue of Jan 12 I would like to cross swords with them however, on one or two points.

While the interchanging of registrars between teaching and non teaching hospitals is an excellent idea, this would take a long time to organise What is needed at once is a genuine attempt by selection committees to appreciate that the teaching hospital candidate *is not* necessarily the better

Furthermore I cannot agree that we should be content with a state of affairs where senior registrars may be told at the end of four years that they have *no* hope of achieving consultant status. I know of no other walk of life where after some twelve years of training a person finds that he has no hope of continuing the work for which he is trained and which moreover he *is* actually doing There can be very little difference, I feel between those who have ' arrived and those who have just ' missed the boat and these doctors must be employed in the work for which they have been trained

Let there be an immediate review of all senior registrars Let their capabilities be assessed, not by the academic yardstick of the teaching school, but by confidential reports from their chiefs and the general practitioners they serve. Let an estimate be made of those who are fit for consultant work and then let every region review the hospitals in its area especially from the standpoint of waiting lists, in order to ascertain whether these men can be employed In my opinion it is only by some such bold plan as this that the problem is ever likely to be solved

PROVINCIAL SENIOR REGISTRAR.

EVOLUTION OF THE TOXIC THYROID GLAND

SIR,—Absence from the clinical arena for six weeks through illness has delayed my reply to the points raised *in letters following my article of Nov 24*

Years ago when starting this investigation I thought it would be possible to study serial sections of the whole gland of each patient Ideally there is no limit to the number of such sections required After preliminary *trials however I soon felt convinced that three sections* carefully selected from characteristic parts of the gland, would suffice for all practical purposes.

Dr Lennox (Dec. 8 p 1091) has approached this subject from a purely pathological viewpoint If he *studies the clinical features, which form the main basis* of my contribution he will find that they all fall into line with the pathological findings in a smooth graduated sequence. The only clinical feature that Dr Lennox mentions is toxicity, which as he says is rare in the *fibrolymphoid phase of Hashimoto s disease* As was indicated in my article in this late phase toxic signs and symptoms are usually difficult to elucidate by the time the patient presents herself for operation But there have been instances of patients with symptoms and signs of *severe thyrotoxicosis whose thyroids showed the classical* pathological features of fibrolymphoid hyperplasia The slow lethargic fibrolymphoid patient (unlike the elephant) readily *forgets* her previous *toxic symptoms* and to elicit them calls for an assiduous study of the patient and *for the active help of her relatives* To rely chiefly as Dr Lennox seems to do, on a B M.R reading probably obtained when the patient is admitted for operation has repeatedly proved misleading Miss Vaux s excellent article which Dr Lennox quotes, is basically a pathological one and as such deals very little with the vast body of clinical evidence Dr Lennox says there are four other explanations for the progressive six phases It would be most helpful if he would set them out in detail

The crux of the problem lies in the pathological demonstration of advancing phases. When progression is demonstrated histologically at successive operations on the *same* patient especially when it is accompanied by corresponding clinical changes even the most hardened sceptic must surely be convinced

Reference to my paragraph on recurrence (p 961 and fig 9) would, I believe, clinch the matter I hope to deal with this feature more exhaustively in the near future

Mr Goldberg (Dec 22, p 1185), in quoting the case of McClintock and Wright, seems to overlook the fact, emphasised in my article that some cases of epithelio lymphofibrosis may remain stationary and a few even retrogress, but most of them progress to a more advanced phase I am mainly in agreement with Mr Goldberg's premises Age, as was indicated in my article, must play an important part in producing the six progressive phases, and the relative ischæmia is assuredly an accessory factor in these pathological changes But I would like to join issue with him when he says that "no case of lymphadenoid goitre has ever been observed to change to Riedel's thyroiditis," and I am hoping to deal with this point when I discuss elsewhere the status of Hashimoto's and Riedel's diseases

I am extremely grateful for these criticisms It is with the aid of such constructive suggestions that one can hope to solve these perplexing problems and produce order from the "fibrolymphoid" chaos of thyroid disease

London, N W T Levitt

"UTILECON"

Sir,—With regard to Dr Penman's inquiry (Jan 12), the reason he could not discover this word in a dictionary is that it was invented and registered by us in 1935, to describe the all purpose vehicles and ambulances of which we have designed and built many thousands The word is a portmanteau version of "utility" and "economy"

Martin Walter Ltd,
Utilecon Works,
Folkestone

W R Lyne Smith
Managing Director

POPULATION INCREASE AND CONTRACEPTION

Sir,—In your issue of Jan 5, under the title of Basic Research into Contraception, Mr Pirie writes

> "Repeatedly during the last century the fear has been expressed that the population of the world may outstrip the food supply, but advances in technology and the opening up of new lands have so far proved the fears groundless Some time, therefore, we will find the wolf at the door, and we should consider now, in good time, what we propose to do about it"

If this reference be to Malthus and Malthusians (and to whom else could it refer, although the second edition of the *Essay on Population* antedated the present hundred years by nearly half a century?), it should be made clear that neither he nor they expressed this fear Those who have attributed it to Malthus have no difficulty in proceeding to bowl over the dummies they have raised Neither Malthus nor those few who know his theory ever suggested that a time would arrive when population would "outstrip the food supply," if only for the reason that no one has yet discovered a method whereby persons may be kept alive without food

Malthus demonstrated—and all subsequent history and research has, I believe, confirmed—that population has always (except for very limited periods, in very limited areas, due to exceptional circumstances) tended to increase beyond the food available, with the inevitable consequence that for some the diet has fallen below the physiological requirement, and thus death, either by actual starvation (as, especially, in China and India) or, more commonly but less obviously, from lowered resistance to disease, continuously removes the "excess-over food" portion of the population This is the principle brake on the rate of increase in world population

There always has been a continuous, hour by hour, regulation of population by deaths it is not a matter of a future crisis, anticipated but not yet here, that can be postponed by discovery and invention It is here now, and was here when, and before, Malthus wrote He suggested, too, that it might be better if regulation were effected at the other end, by births instead of by deaths

It is, therefore, at least 150 years too late to "be in good time" Nevertheless it might be just as well to "consider now," at long last, the actual facts

London, S W 12 Arthur J S Preece

ECONOMY IN X-RAY FILM

Sir,—Dr Brailsford (Jan 19) has evidently had a happy time sniping at clinicians to whose extravagance he attributes the present shortage of X ray films No doubt he will soon advise the abolition of clinicians to put matters right, and the transfer of their work to radiological experts who will get along nicely without using any films at all

Like others who proclaim the clinician's incompetence he likes to have things both ways If a radiograph is normal the clinician is a wasteful ass, if it is abnormal the radiologist is a clever chap and the clinician still a fool for needing an X ray examination to make a diagnosis It's just too easy Dr Brailsford may well be amazed at the trifling radiographic changes of, say, a carcinoma of the bronchus in an apparently fit patient, but clinicians are not Perhaps he would like the victim to wait until there is a worth-while shadow before sanctioning a mutilating operation? It is hard to make sense out of his non sequitur concerning investigations in hospital patients and doctors who do their full complement of domiciliary consultations But if a patient is admitted to hospital for investigations, it would appear logical to request some

If clinicians are in fact wasteful of X-ray films the radiologist can do more than anyone else in checking this by encouraging friendly discussion and collaboration But if Dr Brailsford can only offer olympian criticisms resembling abuse, and contempt for the clinician with his human problems, then he is unlikely to accomplish very much

Cambridge Laurence Martin

LONGER LIFE

Sir,—Dr Parnell's argument (Jan 12) is vulnerable Implicitly, he takes the view that if none of the policy-holders had lost weight, the over-all mortality rate would have been 142% standard, or if all had lost weight 113% standard This cannot be concluded from the data Let us suppose that the group which lost weight were divided into two, one half maintaining leanness, the other being again rendered overweight If the mortality rates had then been 113% and 142% standard respectively, significant conclusions could have been reached The fact that some of the policy-holders did lose weight indicates at once a fundamental difference from those who did not One can postulate any difference from a greater strength of will to a different physical make up in the weight losers, but if one is to adhere to causality in medicine a difference must be conceded

I have previously written[1] of a possible explanation on the Sheldonian thesis If those who lost weight had a higher rating in ectomorphy and cerebrotonia than the others they would have greater ease in approaching leanness and coincidentally tend to live longer. I am sure that many other reasonable alternatives could be offered I quote the one which seems to me the most scientific.

As I see it, the undisputed facts are two that fat people in middle life suffer more severely from Dr Crofts's list of diseases, and that lean people live longer Is there any justification for inferring from this that obesity plays a causal part either in the aggravation of Dr Crofts's diseases or in the onset of Dr Parnell's cardiovascular and renal diseases? One could say that there is a prima facie case for study but nothing more No syllogism can be derived from it

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[1] *Lancet* 1951, ii, 988

I have endeavoured to show as simply as possible that the available information does not allow us to state that the relief of obesity prolongs life and vice versa. My interest lies not in obesity but in the scientific approach to medicine, and it is in this light that I criticise the thesis

The investigation of the problem must begin with the establishment of weight ranges which are optimal for all the somatotypes assuming that there are optima. It would be a tragedy indeed if physicians were to reduce constitutionally large men to invalidism by zealous under feeding and so enter into sharp competition with the phlebotomists of the dark ages

Roffey Park Rehabilitation Centre
Horsham Sussex
R H BOARDMAN

MASS RADIOGRAPHY AND PULMONARY TUBERCULOSIS

SIR,—It is gratifying indeed to see within one week two articles[1] which show so convincingly the supreme value of mass radiography for the detection of pulmonary tuberculosis and other serious chest diseases by placing this method freely at the disposal of general practitioners Dr Sutherland in his admirable paper quite rightly puts the burden of early diagnosis on the G.P.s and he suggests as an important step towards this aim that the British Medical Association should arrange for suitable postgraduate lectures to G.P.s on the Early Diagnosis of Tuberculosis. He may like to know that, with the local branch of the B.M.A I started such lectures last year

May I however differ from Dr Sutherland in his appreciation of the value of sputum examinations arranged by the G.P.? As I have pointed out before[2] a negative sputum return, particularly in the case of one single direct smear has no significance It excludes neither active tuberculosis nor cancer nor any other serious chest disease Moreover I doubt whether the patient—or even the doctor—knows exactly what sort of sputum is required and that non purulent sputum is not likely to show tubercle bacilli Practitioners should, in my opinion, rather be discouraged from wasting time by waiting for the sputum result and from creating possibly undue optimism as a result of a negative return If the sputum is positive the patient has to be radiographed as soon as possible in any case If the result is negative, no information whatever has been gained the patient ought still to be radiographed The statement that sputum examination in the hands of the G.P. is a double-edged sword which can easily do more harm than good if any reliance were to be placed on negative returns, bears repetition.

On the page following Dr Sutherland's article we are informed of a new venture by the North West Metropolitan Regional Hospital Board—a survey designed for "examining radiographically the *whole* adult population of Islington" One wonders by what gentle means of persuasion, propaganda promises or incentives the authorities will secure the wholehearted coöperation of "the whole adult population It will be most interesting to see from the ensuing report on this survey not only the number of people examined and of cases discovered but also the number of people who failed to attend Earlier figures[3] suggest that the success of any mass survey depends entirely on a very high rate of attendance

Holywood Hall Sanatorium,
Wolsingham co Durham
E G W HOFFSTAEDT

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1. Sutherland H *Lancet* Jan. 10, 195 p. 18 Trenchard H. J Unwin Mathers R. *Tubercle* 195 33 70
2. Hoffstaedt, E. G W *Lancet* 1947 ii 955
3. Bradbury, F C S *Ibid* 1948 ii 293, Hoffstaedt E. G W *Ibid* 1950 ii 156

ACUTE THYROIDITIS AND GLUTAMIC ACID

SIR,—In view of the rarity of acute thyroiditis and the increasing use of glutamic acid in the treatment of intellectual defect epilepsy &c, the following case appears to be of special interest

A male imbecile patient aged 22 years, who had no abnormal signs and was in good physical health, was *given 4 g of* glutamic acid daily from Aug 24, 1950

On Oct 2 he developed influenza which was characterised by cough, backache and a temperature of 100·0°F Influenza was prevalent in the hospital at that time; a number of patients in his ward had the disease and this patient's condition was clinically similar to theirs. After forty-eight hours both he and the other patients in that ward were afebrile

Four days later this patient developed a prominent swelling of the thyroid gland and the administration of glutamic acid was discontinued At first the swelling was greatest around the isthmus, but by the following day the whole gland was very tense and tender At the onset of the swelling the temperature rose to 104°F and the patient was very ill neck movements particularly extension, caused severe pain from pressure on the inflamed gland. During the next five days a brassy cough developed, and also slight dyspnœa; and his temperature fluctuated between 102·8° and 99°F

He was treated with penicillin and sulphadimidine, and after sixteen days he had recovered except for some fullness in the region of the thyroid and a husky voice At no time did the thyroid have the "woody" feel ascribed to Riedel's thyroiditis

It is not possible to state whether the glutamic acid therapy did in fact predispose to the development of acute thyroiditis, but this possibility cannot be discounted

Hensol Castle Pontyclun Glam.
T S DAVIES

COLLEGES AND FACULTIES

SIR,—Your memory is generally long but in your leading article last week you overlooked if you did not reject the logical conclusion of your argument—namely fusion of the three Royal Colleges into one Academy Such a body could well embrace the "senior discipline," general practice and speak with one voice for Medicine as a whole

Other advantages of such federation were cogently argued by the late Lord Dawson of Penn It is not too late to reconsider the situation indeed the needs of general practitioners provide the opportunity

London W 1
L ROCK CARLING

Medicine and the Law

Accident with an Electric Blanket

A FIRE caused by an electric blanket was described at an inquest in Cheshire[1] A retired doctor aged 87, who suffered from arthritis was extensively burned when the blanket on which he was lying caught fire and he died a week later An Inspector of Factories said in evidence that one of the thermostats in the blanket had been damaged by the doctor lying on or near it the blanket, it seems should not have been slept upon but put over the patient A representative of the manufacturers on the other hand thought that dampness had produced a short-circuit and caused the fire but there was no evidence to suggest that the blanket was damp The manufacturers specified in their instructions that a waterproof sheet should cover the blanket This particular type of blanket was intended *for use in hospitals and was not suitable for the home* A verdict of "death by misadventure" was recorded

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1 *Liverpool Echo* Jan. 4 1952

Obituary

HAZEL HAWARD CHODAK GREGORY

M.D Lond , F R C P

Dr Hazel Chodak Gregory, consulting physician in diseases of children to the Royal Free Hospital, died in London on Jan 12 Her professional life was centred in the London School of Medicine for Women, where she served for a time as vice-dean, and in the Royal Free Hospital, where for many years she was a distinguished member of the consultant staff

As Hazel Cuthbert she graduated in medicine in 1911, and soon turned to the study of diseases of children For a time she was resident medical officer at the Children's Hospital, Birmingham, but then she returned to London, and in 1913 she proceeded to the degree of M.D , taking the M R C P two years later In the '20s she was appointed physician to the Royal Free Hospital and she held that post till she retired four years ago She was also physician to the East London Hospital for Children, Shadwell The high standards of her professional work and skill were recognised by her colleagues when she was elected F R C.P in 1935 She was the second woman to receive that honour

J D McL writes "Dr Chodak Gregory's work at the Royal Free was done with the greatest efficiency and the least fuss and trouble The peaceful happy wards in her control reflected her own calm happy personality During the war her work was transferred to the E M S Hospital at Arlesey, and her old beautiful wards in the Gray's Inn Road were destroyed by a flying bomb , but no commotion or disaster could overthrow the serenity of her mind All her friends—and they were all who knew her—wished her the many peaceful years of retirement which she had so well earned but did not live to enjoy "

Colonel E C G MADDOCK

DESCRIBING the second part of Colonel Maddock's career, which began in 1920 on his retirement from the I M S , H D K writes

"He had always been interested in bacteriology and now had more time to take it up seriously On the suggestion of his friend, Dr Stenhouse Williams, he volunteered for work at the National Institute for Research in Dairying (of which he later became an honorary research fellow), and he spent the next fourteen years of his working life in the bacteriology department of this institute, living at Shinfield, within a few hundred yards of his laboratory, in a house and garden both of which he steadily transformed from dullness to distinction

"He began his experimental work by investigating the organisms responsible for flavour in butter, and he published a paper on this subject in 1931 Having reacquainted himself during this research with bacteriological technique, and being more inclined to pathological than conservative bacteriology, he then took up the more awkward task of studying the viability of the tubercle organism under various practical conditions on the farm When he began this work, there was little sound information on the length of time during which this organism remained alive in infected pasture, dung, or soil , nor was it established whether animals grazing pasture naturally infected with tubercle organisms could, in fact, acquire the disease in this way He showed that heavy 'artificial' infection of growing grass did, in fact, cause infection in tuberculin tested calves and other animals consuming it, either by grazing it outdoors or eating the cut grass indoors. But under more 'natural' conditions, where cows excreting active tubercle organisms in their dung were allowed to infect a pasture field, no infection could be found in calves allowed to graze the pasture subsequently It was contact with infected animals, whether in the field or indoors, that was of more serious importance in relation to the spread of bovine tuberculosis than was grazing a pasture which had recently held infected stock

Maddock's observations, which were of obvious importance to farmers, were published in three papers in the *Journal of Hygiene* in 1933, 1934, and 1936 During the period of this work he had been awarded a Lawrence studentship of the Royal Society, and later he received grants in aid both from the Agricultural Research Council and the Prophit Trust In 1940 he offered his services to the Ministry of Health, and during the war worked in the field, on the prevention and control of epidemics

"In addition to his professional eminence, his surgical skill, and his bacteriological flair and interest Maddock possessed both dignity of manner and unfailing courtesy and tact. Whilst he could speak plainly and act without hesitation when the occasion required it, he was an essentially kindly and helpful person, held in real affection by his senior colleagues and respected by all who came into contact with him. Hi main hobby was his garden, and he also took an active par in local and parish affairs His quiet good sense, his regard fo mellowness and tradition—which, however, did not preven his acceptance of new ideas—and his thoughtfulness for other were all strong elements in a personality that will be lon remembered "

Dr P B SKEELS

G L D , one of Dr Skeels's contemporaries at Guy' writes "He was the most genial of men His grea charm was his utter friendliness and complete absenc of side A late starter at medicine, he rarely misse an opportunity to add to his store of medical knowledg and if a casual chat with a fellow-student would do i so much the better One was always rewarded with th happy smile which was peculiarly his, and by his ev courteous expression of thanks "

Appointments

LUM, L C , M B Adelaide, M R C P physician-superintende Nayland Sanatorium

MARSDEN, A. J , M B Lpool, F R.C S part time consultant gene surgeon, Rainhill Hospital, near Liverpool.

Colonial Service

BARLOW, J L R , B A , M B Camb M.O , Gold Coast
BEET, E A M R.C.S , D T M & H specialist physician, Nigeri
CARTER, F S M D Camb M R C P special grade M.O Kenya
DALY D P , M.B Glasg M O , Tanganyika
GEMMELL, ELIZABETH, M B Edin., D T M & H M.O Aden
GROVE WHITE R J M.D Dubl , M R.C P , D T M. & H tub culosis specialist, Singapore
HALAHAN R M. M.B Dubl M O Tanganyika
HETREED V W J , M.B Lond C.P.H tuberculosis speciali Nigeria
KONG HOI KIT M B Hong Kong F R.C.S M O Hong-Kong
LESLIE DAVID, M B Lpool M O Federation of Malaya
LESTER, H M. O O B E., PH D Lond , M R.C.S D.M Federation of Malaya
LEWIS W S M R C.S M O , Sarawak.
MACKEY, J P P M B Birm , D P H , D T M & H. sen pathologist Tanganyika
O DONNELL, T A M B N U I M O , Uganda
PHILPOTT PAULINE M B Lond M O Sarawak.
RAM, L M , M.D Punjab M R C P E senior M.O social hygie Singapore
ROSS G I M. M B Aberd , F R.C.S surgeon specialist, Fede tion of Malaya
SLINGER, L A P , O B E , M.A , M B Lond , D.M.S , Brit Guiana
SMITH G G M.R C S D M.S , British Honduras
VAUGHN JOHN, M D Glasg medical research officer grade (pathologist) East African Medical Survey
WRIGHT P S M B Lond gynæcological and obstetri specialist, Hong Kong

The Terms and Conditions of Service of Hospital Medical a Dental Staff apply to all N H S hospital posts we advertise, unl otherwise stated Canvassing disqualifies, but candidates may norma visit the hospital by appointment

Births, Marriages, and Deaths

BIRTHS

COCHRANE —On Jan 13, in London, the wife of Dr A A Cochrane a daughter

DENT —On Jan 7, the wife of Dr Charles Dent, of Chelsea a daughter

KNOWLES —On Jan 15, at Croydon, the wife of Dr Colin Knowles a daughter

MANN —On Jan 17 in London, the wife of Dr P G Mann a son

NICOLL.—On Jan 13, at Yeovil, the wife of Mr J A Vere Nico F R.C S D.A.—a son

MARRIAGES

MUNRO—WHITE.—On Jan 15, in Glasgow, John Macgreg Munro, M B , to Heather White, M B

DEATHS

BROWNE.—On Jan 17, at Farnborough Park, Hants Edward Geor Browne, C B C.M G L.R C.S I , major-general, late R.A M C ret

GASKELL.—On Jan 12 at Fareham Hants Surgeon Vice Admir Sir Arthur Gaskell K C B O B E , F R.C S

HEATH —On Jan. 19 at Otley near Ipswich James Glover Heat M.R C.S. barrister-at law, formerly of Johannesburg

LAUDER THOMSON —On Jan 14 at Barnton Midlothian Thom Macartney Lauder Thomson M D Edin., D P H aged 74

SYMES THOMPSON —On Jan. 18 at Oxford Henry Edmund Syme Thompson, M D Camb , M.R.C P , of Finmere, Bucks

Notes and News

TRIBUTE TO SIR ALLEN DALEY

On Jan. 11 100 senior members of the London County Council's public-health department held a dinner at County Hall in honour of Sir Allen Daley who is retiring after 12 years service as London's county medical officer of health It was a cheerful gathering at which doctors dentists, nurses chemists lay administrators and sanitary inspectors from County Hall and the divisional offices sat together without a difference of opinion, without passing a file in any direction, and without even wanting a cup of tea. They met to show Sir Allen their admiration and affection, and to wish him health and happiness in his retirement.

Dr J A Scott, as deputy medical officer of health presided and in proposing a toast to Sir Allen spoke of his 40 years of unremitting zeal and devotion to public health work Dr Scott recalled learning in the United States that a coordinator is "a guy that has a desk between two expediters while an expediter was defined as 'one appointed to confound confusion with commotion (Some of his listeners did a little quick mental cap-fitting among themselves and called for more wine) Mr Ritchie Young chief dental officer recalled Sir Allen's imperturbability in committee and his brilliance in providing ready and apparently satisfying answers to the most searching and unexpected queries of council members. In describing how Sir Allen Daley had deftly turned a committee quiz on the difference between a dentist and a dental surgeon, Mr Young gave his own definitions of his colleagues—'A doctor is a professional man trying to be practical; a dentist is a practical man trying to be professional; while a dental surgeon is a simple man trying to be both. Tributes were also paid by Dr F R Waldron, by Miss Hunter the chief treatment officer and by Mr Strange establishment officer

In his reply, Sir Allen outlined the changes in public health administration and practice since his first M.O.H appointment He recalled with pride past eminent colleagues in the L.C C. health department, and pointed out that he was only the fourth medical officer of health to the council since it was formed in 1888. Miss J M Calder the chief nursing officer, presented a bouquet to Lady Daley The family party was completed by Sir Allen's two children, Miss Doreen Daley M.R.C.O.G and Dr Raymond Daley

University of Oxford

On Dec 15 the following degrees were conferred:

D.M—J J Pritchard B F Swynnerton.

B.M—W T Barrett J. P Blandy C F Bolton B T Bond H B Calwell, I O Carlisle M. S Compton J. M. Davies, D H Eaton, M A. Fenton, Jean Ginsburg, Hélène V Goodman, P. D Grant, O T Harvey, W M. Jordan, I S. L. London, F S. Keddie W F C. Kennedy D H Malan C V Mann K. F R Schiller J A. Smith, A M. Stobie M. W Sweet Escott, E. T C. Towson K. L M Thomson, P R. Walker R. D Weeks, William Whitechurch D F Woodhouse

In absentia.

University of Cambridge

Mr O L. Zangwill has been appointed professor of experimental psychology in succession to Sir Frederic Bartlett, F.R.S

University of London

On Jan. 9 the following degrees were conferred:

M.D Branch I (medicine).—K D Allanby (university medal) D E St. J Burrowes D J Charley K. M. Citron H E. F Davies H C Deuchar M. E. Fearnley P. R Fleming R. S Francis Joan Frankton H. J Goldsmith Helen C Grant I L. de V Hart L T T Higgins, Kenneth Hugh-Jones R. C King, Seymour Mason, Margaret R Miller H I Obeyesekere W D Ratnavale, M J Ellicott, F P H Rosenthal Odharji Tribhovandas Samani R E Sarage D J Sheehan, Kenneth Simpson J D Stevens Joyce F Taylor P S. Tweedy.

M D Branch II (pathology)—D M. H Cogman J B Enticknap G A James, C R Knappett C H R. Knowles, I L M. Larkin I B. Lerman, A C F Ogilvie, N P Orchard, Roy Pilsworth I J Rubenstein K E. Saunders G B D Scott, B J Stephens O U Williams.

M.D Branch III (psychological medicine).—Leslie Ford

M.D Branch IV (midwifery and diseases of women).—J C Bowman, G. D Pinchard.

M.D Branch V (hygiene)—A E. Brown R. O Davies Margaret I Henline, A C. McLeish

M D Branch VI (tropical medicine)—Rachit Burt H. McD Ford K R P Kent.

Faculty of Radiologists

At a recent examination for the fellowship the following were successful:

I. ApThomas K F Barlow J C Bishop J L. Boldero, and S Mong (radiodiagnosis); W D Fraser and J M W Gibson (radiotherapy)

University of Birmingham

On Dec 14 the following degrees were conferred:

M.D—J H. Hale, D G B Richards.

M B Ch B—H W K. Acheson, D B Allsop P R. Clarke K O Dickinson G. T G Flear E. R Ford Sheena Forsyth, R. J Generer Doreen Grimshaw Courtney Hodgson, V A Lloyd C A H McLaren, David Martyn Johns S, G F Maltz A. T Smyth B G Spilsbury J C N Tibbits, Oliver Troughton

In absentia

The following two developments in the clinical course have been approved

Senior clinical students will in future be attached to approved general medical practitioners for short periods

University clinical lecturers are to be invited to act as tutors to medical students during the three years of the clinical course

Leonard Parsons Memorial Lectureship Appeal Fund—This fund has reached £4750 and a committee has been set up to consider the terms and conditions of the lectureship.

University of Glasgow

On Jan. 12 the following degrees were conferred:

M D—A J V Cameron (with honours) K C. Grigor A G Macgregor and F. C. Rodger (with high commendation); Major General Thomas Young (with commendation); W A Dewar

Ch M—John Hutchison (with high commendation) D St C L Henderson (with commendation)

M B Ch B—Shedden Alexander I R. G Barclay J D Begg A W Bennie, J W Browning Ronald Budge J C. Burgess, J D Caldicott, Evelyn M. Camrass, Doreen M Chisholm A. S Cooper L. MacD Craig, Daniel Crabren, A R. B Culhane John Curley G M. Currie Edward Diamond E. D Docherty J. A Docherty A L. C Duncan T H Fairbairn, Peter Forrester, W V Fowler, J. R. Freeland, R. A Garden, L A Gibson, H P Gillespie W D S Hepburn John Houston R D Hunter Mary G S. Hyslop James Lambie W K. Lawson, J A Levy R. H Mackay, Moira R Mackie T. C G. McKirdy Murdo MacLean William McLellan A G W McLeod Allan McQuater W. L Martin, R H. D Miles, John Mitchell G P Moffat, J MacG. Munro T H Neilson, J M Paterson James Rintoul W I Ritchie, N MacN Robertson C G Robson, Charles Rooney W H Sadler Katherine S Scott Jharna Sengupta, James Sharp R. A. Speirs John Stevenson W H S Thomson Ann M. Wilson.

Gresham College

Prof Hamilton Hartridge F.R.S., will lecture at the college on Jan 28 29 30 and 31, on the Physiology of the Brain Further particulars will be found in our advertisement columns.

Nuffield Dental Fellowships

One of the aims of these fellowships is to enable graduates in medicine and science to receive training that will qualify them to undertake teaching and fundamental research on dental health and disease The annual value of a fellowship is between £500 and £800 a year Further particulars will be found in our advertisement columns.

Colonial Medical Research Committee

Dr A. C Frazer professor of pharmacology in the University of Birmingham has been appointed a member of this committee.

Association of Psychiatrists of the Scottish Western Region

The following office-bearers have been elected for 1951–52 chairman, Prof T Ferguson Rodger vice-chairman Dr W Mayer Gross; secretary, Dr J F McHarg treasurer Dr J Milne

Laboratory Animals Bureau Congress

The fifth congress of animal technicians will be held in Cambridge on Monday March 31 and Tuesday April 1 Sir Lionel Whitby will give the opening address. Further particulars may be had from the bureau M.R C Laboratories Holly Hill, London N W 3

Hunterian Society

A service will be held at St Martin in the Fields at 11 A.M on Thursday Feb 14 when Sir Henry Dale O.M. will unveil a plaque to commemorate the fact that John Hunter was buried in this church until 1859 when the remains were removed to Westminster Abbey The discovery of the Hunter coffin was made by Frank Buckland whose name is also commemorated on the plaque. The service will be taken by the Dean of Westminster an address will be given by Sir Gordon Gordon Taylor and the lesson will be read by Sir Cecil Wakeley

The annual dinner of the society will be held the same evening at the Savoy Hotel London W C 2 Further particulars may be had from Mr Alec W Badenoch 110 Harley Street W 1

South African Research Fellowship

Applications for the 1952 award of the Eli Lilly medical research fellowship are invited from doctors registered in South Africa Applications should reach Dr L Eales, Cape Town Post-Graduate Medical Association, P.O Box 2980, Cape Town, South Africa, before May 8

Courses on Mental Deficiency

The extramural department of the University of London, in coöperation with the National Association for Mental Health, is holding two courses this year in London, for school medical officers and certifying officers under the Mental Deficiency Acts, on educationally subnormal children and mental defectives The first course will be from May 5 to 23, and the second from Oct 6 to 24 Further information may be had from the Association, 39, Queen Anne Street, London, W 1

Films in Teaching

A joint meeting of the Royal Society of Medicine and the Scientific Film Association on Recent Research on the Effectiveness of Films in Teaching will be held at 1, Wimpole Street, London, W 1, at 8 P M on Friday, Feb 29 The opening speakers will be Prof Patrick Meredith, from the department of psychology, University of Leeds, Dr H Ellis Lewis, from the department of physiology, University of London, and Mr John Maddison, from the Central Office of Information

Exhibition of Austrian Books

The Anglo Austrian Society is holding, at the National Book League, 7, Albemarle Street, London, W 1, from Jan 24 to Feb 6, an exhibition of Austrian books which will include 300 of the most recent medical publications Admission is free and the exhibition is open daily during the week from 11 A M to 6 P.M and on Wednesdays and Thursdays from 11 A.M to 9 P M.

Investigation into Homologous-serum Jaundice

The Ministry of Health has asked the blood transfusion services of Liverpool, Manchester, and Cardiff to collaborate with the Medical Research Council in an investigation of patients who have received transfusions of either irradiated plasma or small pool plasma, in order to compare the incidence of homologous serum jaundice in the two groups A control series of patients receiving only blood will also be surveyed Each hospital will be provided with either irradiated or small pool plasma, but not with both, and patients who have received either kind (with or without blood) will be followed up five months after the transfusion The survey is to last three years

British Standards

Notes on Methods of Screening Hospital Patients (B S 1805/1951) —These notes are the result of an investigation into the methods of screening patients in various types of hospital. The methods of screening in most common use are described, together with their advantages and disadvantages

Dimensions and Nominal Voltages of Batteries for Valve-type Hearing Aids (B S 966/1951) —This is a revised form of B S 966/1949, which has been expanded to cover both high tension and low tension batteries and specifies the designation, nominal voltages, dimensions, and methods of connection.

Copies of these standards may be obtained, price 2*s* each, from the British Standards Institution, Sales Department, 24, Victoria Street, London, S W I

EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1061 The proportion admitted was 83 1% A white warning was issued on Jan 18 and cancelled on Jan. 22

Sir Edward Mellanby, F R.S, has received the Royal Swedish Order of the North Star (commander, first class) in recognition of his services to medical research in Sweden.

CORRIGENDUM *Central Film Library* —The address of this library, which was mentioned in the issue of Dec 29 (p 1232), is Government Building, Bromyard Avenue, Acton, London, W 3

Sir Arthur Porritt surgeon to St Mary's Hospital London is visiting Turkey and Greece between Jan 23 and Feb 11, to lecture for the British Council

Diary of the Week

JAN 27 TO FEB 2

Monday, 28th

UNIVERSITY OF LONDON
5 30 P M. (University College, Gower Street, W C 1) Dr E. Jacobsen (Copenhagen) Metabolism of Ethyl Alcohol.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, S E 1
5 P M Dr T. H. Whittington Ptosis

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, S E 5
5 30 P M Dr E Stengel Lecture-demonstration.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8 30 P M Sir Lionel Whitby, Mr Rodney Maingot Surgery of the Spleen and its Indications

MANCHESTER MEDICAL SOCIETY
4 30 P M *Section of Odontology* (Dental Hospital.) Prof R J Last Anatomy for the Clinician.

Tuesday, 29th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene, Keppel Street, W C 1) Prof A Haddow Carcinogenesis

INSTITUTE OF DERMATOLOGY, St John s Hospital, Lisle Street W C 2
5 30 P M. Dr R T Brain Epithelioma

SOCIETY FOR THE STUDY OF ADDICTION
8 P M (1, Wimpole Street, W 1) Dr Jacobsen A New Form o Treatment for Delinquent Alcoholics

PADDINGTON MEDICAL SOCIETY
8 45 P M (St. Mary's Hospital, Paddington, W 2) Mr V H Ellis Painful Backs

Wednesday, 30th

INSTITUTE OF DERMATOLOGY
5 30 P.M. Dr R W. Riddell Mycology—sporotrichosis blastomycosis

RENAL ASSOCIATION
4 30 P M (41, Portland Place, W 1) Prof Jean Hamburger Disorders of Cellular Hydration Dr S J. De Navasquez Experimental Pyelonephritis

MEDICAL WOMEN'S FEDERATION
8 30 P M (Royal Free Hospital School of Medicine, 8, Hunte Street, W C 1) Dr Charlotte Naish Breast feeding without dogma

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St Vincen Street, Glasgow C 2
5 P.M Dr Raymond Lowthwaite Treatment of Typhus an Typhoid with the Newer Antibiotics (Burns lecture)

Thursday, 31st

UNIVERSITY OF LONDON
5 30 P M (University College) Prof Bernhard Katz Differen Forms of Signalling Employed by the Nervous System.
5 30 P M (Westminster Medical School, Horseferry Road S W 1) Prof P Govaerts (Brussels) Physiopathology o Glucose Excretion by the Human Kidney.

ROYAL COLLEGE OF SURGEONS, Lincoln s Inn Fields, W C 2
5 30 P M. Dr Manuel Lederman Radiation Treatment o Cancer of the Larynx

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene) Dr L O Thomson Physiological Basis of Visual Sensation

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner S W 1
4 30 P M Sir Paul Mallinson Psychiatry lecture-demonstration

INSTITUTE OF DERMATOLOGY
5 30 P M. Dr J O Oliver Histopathology—epithelioma

ROYAL ARMY MEDICAL COLLEGE, Millbank, S W 1
5 P M. Sir Cecil Wakeley Modern Trends in the Treatment of Carcinoma of the Breast

INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Great Ormond Street, W C 1
5 P M Mr Denis Browne Surgery in the Newborn

MIDDLESEX COUNTY MEDICAL SOCIETY
3 P M (Central Middlesex Hospital, Park Royal, N W 10) Clinical demonstration and short papers

EPSOM AND SUTTON INTER HOSPITAL PSYCHIATRIC ASSOCIATION
5 30 P M (Horton Hospital, Epsom) Clinical meeting

UNIVERSITY OF ST ANDREWS
5 P M. (Medical School, Small's Wynd, Dundee) Prof Thomas Ferguson Disabled Youth

Friday, 1st

INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY
5 30 P M (London School of Hygiene) Dr Wallace Brigden Cyanotic Congenital Heart-disease

INSTITUTE OF DERMATOLOGY
5 30 P M. Dr Brain Epithelioma and Epithelial Tumours

WHIPPS CROSS HOSPITAL MEDICAL SOCIETY
8 30 P.M Dr J N Morris Coronary Heart disease in Doctors.

Saturday, 2nd

BRITISH ASSOCIATION OF ALLERGISTS, 1, Wimpole Street, W 1
10 30 A M. Dr H A. Lucas Histopathology of Rhinitis Dr J Pepys Eosinophilia Prof G W Pickering Allergy and A C T H
2 30 P M Dr B Halpern Basis of Anti histamine Therapy Dr C J C Britton Anti histamine Therapy in Clinical Practice

SURGICAL TREATMENT OF HYPERFUNCTIONING LESIONS OF THE ADRENAL CORTEX*

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In less than thirty years a relatively safe surgical attack has been devised for a gland which has protean functions and whose overactivity produces profound physical, chemical, and physiological changes This achievement is the result of the combined efforts of internists, pædiatricians chemists (particularly the steroid chemists) physiologists, and surgeons from all over the world I shall mention certain studies with which I am personally acquainted, but it should be recognised that many important ones could not be included

Methods for the assay of urinary steroids have been developed which are helpful in diagnosis and in determining the results of treatment For patients presenting clinical syndromes known to be associated with overactivity of the adrenal cortex the problem of differentiating between tumour and hyperplasia has been simplified though not entirely solved by methods of urinary assay (Kepler and Mason 1947) Thanks to the greater availability of some of the adrenal steroids in natural and synthetic forms, the physiological effects of several of the hormones in this group have been elucidated by both animal and clinical studies As a by product of these studies it is now possible to explain many though not all of the symptoms and signs presented by patients with hyperfunctioning lesions of the adrenal cortices Metabolic studies and identification of the urinary excretory products of the adrenal steroids have further clarified the pathological physiology of these lesions

My interest in abnormal activity of the adrenal gland dates back to 1924, when Keyser and I reported a case of carcinoma of the adrenal gland with endocrine disturbances (Keyser and Walters 1924) The patient died of adrenal cortical insufficiency after removal of a large cancerous tumour At necropsy a small atrophic adrenal gland was found on the opposite side. We have since found that an atrophic gland is often present on the side opposite a unilateral hyperfunctioning benign or malignant adrenal cortical tumour The use of adrenal cortical extracts, which we did not have in 1924 and more recently cortisone in association with these extracts, has enabled us to remove hyperfunctioning tumours of the adrenal glands from more than 30 patients without a postoperative death from adrenal cortical insufficiency or other causes.

In 1934 Wilder, Kepler and I reported 10 cases of hyperfunctioning lesions of the adrenal glands (Walters et al. 1934b) and in 1938 Kepler and I added 7 more (Walters and Kepler 1938) Recently Sprague and I have reported an additional 8 cases (Walters and Sprague 1949). Largely through the stimulating influence of Kepler and Sprague, Priestley, Clagett, and I have proceeded cautiously with bilateral adrenal resections in the treatment of Cushing's syndrome when hyperfunctioning cortical tumours were not present. Kepler et al (1948) have studied the basic physiological and chemical changes in blood and urine of these and the patients with adrenal cortical tumours.

COMPOUNDS OF ADRENAL CORTEX

Twenty-seven complex steroids have been isolated from the adrenal cortex and their chemical structures have been determined. This work has permitted study of the physiological activity of the adrenal steroids in animals and in some instances in man Among the most important of these steroids are desoxycorticosterone (deoxycortone), and the compounds A (11-dehydro corticosterone) B (corticosterone), E (11 dehydro 17 hydroxycorticosterone) and F (17 hydroxycorticosterone), which have been isolated by my colleague, Kendall, and by Reichstein, Wintersteiner and Pfiffner Table I shows the active compounds isolated from the adrenal cortex and their predominant effects

Deoxycortone

This is the most familiar Its predominating effect is on the metabolism of salt and water It is widely used in the form of the acetate in the treatment of Addison's disease Excessive doses cause retention of sodium chloride and water and an increase of the urinary excretion of potassium Œdema, hypertension and congestive heart failure may result from retention of salt and water Loss of potassium may lead to profound muscular weakness The production, in dogs, of a syndrome resembling diabetes insipidus by the administration of large doses of deoxycortone acetate by Ragan et al (1940) suggests that the polyuria present in some cases of Cushing's syndrome is perhaps attributable to excessive production of these compounds. The work of Dorfman et al (1947) on the recognition of minute quantities of deoxycortone by observing its effect on the urinary excretion of radioactive sodium is a promising lead with regard to assay of this hormone in body fluids. At present however there is no practical method for the assay in body fluids.

Compounds A B E and F (Kendall)

The most potent hormones of this group are 11 dehydro 17 hydroxycorticosterone (cortisone or compound F of Kendall) and 17 hydroxycorticosterone (compound F of Kendall) An important effect of these hormones is on the metabolism of carbohydrate and protein Administered to persons who had Addison's disease and diabetes cortisone intensified the diabetes by augmenting the excretion of sugar nitrogen and ketone bodies (Sprague et al 1947) White and Dougherty (1945) have shown that cortisone causes involution of the thymus and lymphoid tissue with liberation of gamma globulins and immune bodies. Overproduction of hormones having physiological effects like those of cortisone and compound F explains some symptoms, observed in cases of tumour of the adrenal cortex which depend on disturbances of the metabolism of carbohydrate and protein Among these are diabetes mellitus negative nitrogen balance muscular wasting weakness osteoporosis thinning of the skin and ecchymosis (possibly due to weakening of the blood vessels) The now well known effect of the adrenal cortex on lymphoid tissue might explain the

TABLE I—ACTIVE COMPOUNDS ISOLATED FROM THE ADRENAL CORTEX *

Effect	Compound
Salt and water metabolism	Deoxycortone
Carbohydrate and protein metabolism	11-dehydro 17 hydroxycorticosterone (compound E or cortisone) 11-dehydrocorticosterone (compound A) Corticosterone (compound B) 17 hydroxycorticosterone (compound F)
Fat metabolism (?)	11-dehydrocorticosterone (compound A) Corticosterone (compound B)
Androgenic effect	Androstenedione 11 hydroxy iso-androsterone Adrenosterone 17-hydroxyprogesterone
Œstrogenic effect	Œstrone
Progestational effect	Progesterone

* With modifications from Kepler et al. (1948)

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* The Lord Moynihan lecture given at Leeds on Oct. 18 1951

lymphopenia which is characteristic of Cushing's syndrome Practical methods are available for the estimation of some of the excretion products of hormones of this type in the urine These are the determination of glycogenic corticoids by the bio-assay method of Venning et al (1946), and the chemical determination of corticosteroids by the method of Corcoran and Page (1948) or one of its modifications At the Mayo Clinic we are using the latter or chemical method for the determination of these corticosteroids The excretion of these substances by patients who have tumours of the adrenal cortex associated with features of Cushing's syndrome is usually increased

11-dehydrocorticosterone (compound A) and corticosterone (compound B) probably influence the metabolism of fat This is one of the least explored aspects of the function of the adrenal cortex Obesity is one of the outstanding features of some patients who have hyperfunctioning lesions of the adrenal cortex Patients who have Addison's disease, however, have difficulty in gaining weight Kendall (1945), in association with Heilman, has obtained some evidence that the administration of compound A (11 dehydrocorticosterone) to certain strains of mice leads to an increase in the amount of fat, measured either as a percentage of the total or as the absolute amount, in the animal Kochakian (1949) confirmed this observation in some experiments but not in others Thorn (1949) has observed a decrease in the fæcal excretion of fat by patients with Addison's disease treated with compound A. Some evidence indicates that these compounds are a part of that group of hormones, the urinary excretion products of which are measured collectively as the so called glycogenic corticoids or corticosteroids

Androgenic Compounds

Virilism in its several manifestations, including hirsutism, baldness, amenorrhœa, florid skin, hypertrophy of the clitoris, acne, masculinisation of the voice in women, and alteration of the habitus in the direction of masculinity might result from production of excessive amounts of androgenic material by an adrenal cortical tumour The occurrence of sexual and somatic precocity and achondroplastic habitus in children might be explained in a similar manner

Œstrone

Overproduction of œstrogens and compounds which have an action like that of progesterone might explain the occasional occurrence of vaginal bleeding and sexual precocity in girls who have tumours of the adrenal cortex, and the occurrence of impotence and gynæcomastia in men Œstrogen producing tumours of the adrenal cortex are relatively rare, but bio assay and chemical methods have been developed for the determination of œstrogens in the urine The presence of pregnanediol, an excretion product of progesterone and possibly also of deoxycortone, can be determined chemically However, pregnanediol is excreted in the urine not solely in cases of tumour of the adrenal cortex but also in some instances of hyperplasia of the adrenal cortex, in cases of ovarian tumours, and also during pregnancy

TABLE II—SYMPTOMS OF TUMOURS OF THE ADRENAL CORTEX*

I, *Non endocrine symptoms*

II, *Symptoms depending on age and sex*
  Boys homologous sexual and somatic precocity
  Girls sexual and somatic precocity, usually heterologous, sometimes uterine bleeding and enlargement of the breasts
  Men feminisation
  Women various degrees of virilism

Symptoms independent of age and sex
  Altered habitus facial and abdominal obesity, kyphosis, thin arms and legs
  Purplish stria and ecchymosis
  High colour
  Hypertension
  Osteoporosis
  Diabetes
  Acne
  Polycythæmia
  Hypochloræmic alkalosis
  Purpuric ecchymosis
  Fatigue
  Muscular atrophy

* With modifications from Kepler et al (1948)

A patient who has a hyperfunctioning lesion of the adrenal cortex associated with obvious virilisation is likely to excrete a large amount of 17-ketosteroids in the urine When evidence of virilisation is minimal or lacking, as in Cushing's syndrome, the excretion of 17-ketosteroids may not be high

TUMOURS OF ADRENAL CORTEX

There is no single syndrome which is characteristic of adrenal cortical overactivity The clinical picture is variable and often mixed and presumably depends on the type and quantity of the steroid hormones produced, the age and sex of the patient, and perhaps other factors (table II)

The changes produced by tumours of the adrenal cortex in the sexual sphere are among the most spectacular Sexual precocity of masculine type, in combination with somatic precocity, may occur in young boys In young girls, on the other hand, sexual precocity is likely to be heterologous or masculine in character, although homologous sexual precocity with uterine bleeding and enlargement of the breasts occasionally develops Because a masculinising tumour is not likely to enhance the masculinity of a male, and feminising tumours in adult males are excessively rare, sexual changes are rarely observed in adult men In adult women, on the other hand, heterosexual changes are relatively common For example, amenorrhœa develops, the breasts assume a more masculine appearance, the clitoris hypertrophies, and alopecia of the scalp, in association with hirsutism and acne of the face, extremities, chest and lower part of the abdomen, may occur In cases in which changes in the direction of increased masculinity dominate the clinical picture the term "adrenogenital syndrome" may properly be applied

The endocrine and metabolic signs and symptoms which bear no consistent relationship to the age and sex of the patient (table II) represent an extremely varied group of disturbances The most nearly complete development occurs in Cushing's syndrome,† but patients who do not present the complete clinical picture described by Cushing may present evidence of endocrine and metabolic change of various degrees For example, one of the patients described by Walters and Sprague (1949) presented some of the features of virilisation (hirsutism of the face and extremities and amenorrhœa) but in addition exhibited some of the endocrine and metabolic manifestations of Cushing's syndrome (hypertension, ecchymosis, diabetes, and a hypochloræmic hypokalæmic alkalosis) Other patients presenting mixed or incomplete clinical syndromes are seen not uncommonly Thus it is clear that a rigid classification of signs and symptoms of adrenal overactivity is difficult

Surgical treatment, as indicated previously, consists of removal of the adrenal gland harbouring the tumour when feasible Supportive measures, which will be described later in connection with subtotal adrenalectomy, are necessary in the postoperative period to prevent reactions and death

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† In speaking of Cushing's syndrome, I refer to the clinical picture described by Cushing and not specifically to the pathological basis for this syndrome In the past it has been thought that Cushing's syndrome is always associated with a basophilic tumour of the anterior lobe of the pituitary Our experience and that of others on the contrary has shown that this syndrome may occur in the absence of a basophilic tumour of the pituitary but is probably always associated with overactivity of the adrenal cortex

CUSHING'S SYNDROME

Cushing (1932b) described 14 patients who had signs and symptoms which simulated those associated with hyperfunctioning tumours of the adrenal cortex The essential features were buffalo type of obesity and hypertension osteoporosis, ecchymosis, latent or frank diabetes, and amenorrhœa or impotence In the buffalo type of obesity the face neck, and trunk are fat and the extremities thin Since basophilic cells in excess or in adenomatous formation were found in the pituitary gland in these 14 cases Cushing (1932a) applied the term "pituitary basophilism to these cases Kepler (1933) presented 4 cases of pluriglandular symptoms in which the appearance was similar Two patients who had been ill a long time seemed to have Cushing's pituitary basophilism Of the 2 patients who survived only a short time 1 had no tumour or other histological abnormality of the pituitary gland, and both had hyperplastic adrenal glands and pathological changes in the head of the pancreas One of these 2 patients had a thymoma Walters et al (1934b) presented data on 10 patients who had the so-called suprarenal cortical syndrome Two were found to have bilateral hyperplasia of the adrenal glands and normal pituitary glands on examination by serial section

In 2 other cases bilateral exploration showed adrenal glands without gross evidence of tumours, hypertrophy or hyperplasia. Specimens removed from each gland in both cases showed no evidence of hyperplasia on microscopy A year after the operation 1 of the patients died at home; the pituitary gland contained an adenoma 5 mm. in diameter composed of basophilic cells

Costello (1936) at the clinic, examined 1000 pituitary glands obtained at necropsy in cases in which there was a history of endocrine abnormality He found that about 200 (20%) contained adenomas, but only a fourth of the adenomas were basophilic Similar percentages were found by Roussy and Oberling (1933) Commenting on Costello's statistics Kepler (Walters et al 1934b) stated: "With the random incidence of basophilic adenoma less than 4% as the foregoing seems to indicate it must be more than a coincidence that the pathologist should have found basophilic tumours in the pituitary body in one of ten cases in which the syndrome of 'pituitary basophilism' had been recognised The possibility is entertained that a possible basophilic tumour of the hypophysis incites the hyperplasia and the growth of adenoma in the suprarenal glands From the evidence at hand in this disease one might speculate equally logically that the dominant part is taken by the adrenal gland even in cases in which basophilic tumours of the hypophysis were present.' This led to his suggestion that in the absence of adrenal cortical tumour bilateral adrenal resection be done On Sept 5 1932, and again on May 22 1934, I did such a resection, removing half of each adrenal gland The therapeutic results were not impressive It was not until 1942 or 1943 that Kepler pressed the thesis of subtotal adrenalectomy in cases of Cushing's syndrome and patients were operated on by Clagett and Priestley From 1946 on after my return from service in the navy I participated in the programme

At the last meeting (April 11-13 1951) of the American Surgical Association Priestley et al (1951) presented a preliminary report of the results of subtotal adrenalectomy for Cushing's syndrome in 29 cases in which surgical exploration did not reveal a hyperfunctioning tumour The group was composed of 23 females and 6 males All of the 29 patients in the series presented a combination of clinical and laboratory findings adequate for a diagnosis of Cushing's syndrome Most of the patients had the condition in severe form One had a severe mental depression and another a milder one with thoughts of suicide if she did not recover Both responded in a remarkable fashion to subtotal adrenalectomy All 29 patients had hypertension the characteristic habitus and some abnormality of the skin Twenty-eight had plethora 24 cervicothoracic fat pads; 20 cutaneous striæ; 26 purpuric ecchymosis 18 acne; and 10 keratosis pilaris. The 1 patient who did not have a florid complexion had myxœdema resulting from previous thyroidectomy Twenty five of the patients complained of muscular weakness, which was usually greatest in the legs Only 4 women had normal menstrual periods. Twenty two patients had frank or latent diabetes and osteoporosis About half the patients excreted a normal or less than normal amount of 17 ketosteroids in the urine and the amount excreted was greater than normal in the remainder The excretion of corticosteroids in the urine was normal in 4 cases, was not determined in 2, and was greater than normal in the remaining 23 cases Lymphopenia and an alkaline urine were each found in slightly more than half the cases Low values for plasma potassium levels or high carbon dioxide combining power, or both were present in 9 cases Radiography of the skull showed that the sella turcica of 1 patient was definitely enlarged by a pituitary tumour and that there was no evidence of a pituitary tumour in the other 28 cases.

Subtotal adrenalectomy in these cases was performed as follows if the first gland explored was not atrophic, subtotal (90%) resection of this gland was performed; at an appropriate time thereafter the second gland was exposed and total adrenalectomy was performed on that side It used to be our policy to explore the remnant of the previously resected gland to make certain it was viable before adrenalectomy on the opposite side Recently confidence in our ability to preserve a viable portion of the adrenal gland at the time of the initial resection has increased and we proceed with total adrenalectomy on the opposite side without exploration

Six of the 29 patients died Four of the hospital deaths occurred in the first 10 cases and 1 death occurred at home after the patient had been discharged Nineteen patients obtained excellent remission from Cushing's syndrome but to date 3 have had recurrences of the signs and symptoms of Cushing's syndrome These recurrences developed after remissions of three years, two years, and nine months Three of the 19 patients have adrenal cortical insufficiency and require daily substitution therapy It is too early to determine whether the others will have recurrences however, the results have been encouraging and seem to justify continued use of this operation until definite conclusions can be reached

PHYSIOLOGICAL AND CHEMICAL ASPECTS OF TREATMENT

The patient reported by Keyser and Walters (1924) was operated on in 1923 for carcinoma of the left adrenal gland and died on the fourth postoperative day Within twenty four hours of the operation the pulse-rate and temperature rose and drowsiness ensued A low indeterminate systolic blood pressure was noted This continued for twenty four hours during which time a transfusion of citrated blood was given followed by a slight favourable reaction The blood pressure continued to be low the pulse-rate and temperature high Adrenaline was given subcutaneously and by rectum On the fourth day the patient went into coma and died after several hours of unconsciousness

Walters et al (1934a) reported the case of a patient who underwent operation on Sept 12 1933 Symptoms of adrenal cortical insufficiency developed a few hours after removal of an extensive adenocarcinoma from the right adrenal cortex The patient was treated with cortical hormone and infusions of sodium chloride and she recovered The second patient a girl 9 years of age, was operated on in October 1933 for an encapsulated cortical carcinoma of the left adrenal gland She was given a total of 21 ml of cortical hormone in the first six days after operation and recovered The third patient was given an extract of adrenal cortex postoperatively, and the fourth had signs of adrenal cortical insufficiency which was controlled by the administration of adrenal cortical extract postoperatively

Walters and Kepler (1938) emphasised the fact that

> "the most important factor in surgical therapy, to our minds, is the anticipation, prevention and control of postoperative adrenal cortical insufficiency This consists essentially of the preoperative and postoperative administration of potent extracts of the adrenal cortex and parenteral and oral administration of adequate amounts of a solution of sodium chloride and sodium citrate, and the administration of a diet that is low in potassium These procedures tend to control the impending adrenal cortical insufficiency which has probably been responsible for the high mortality (50% previously reported by Lukens and his associates, by Cahill and his associates, and by Scholl) The method outlined is essentially that which at the clinic has been found to be effective in controlling various degrees of adrenal insufficiency in Addison's disease and has been used in all our cases of suspected adrenal cortical tumours Its effectiveness is illustrated by operative recoveries in 7 cases , in 2 of the cases the adrenal glands on the opposite side were found to be atrophic It must also be remembered that the outstanding characteristic of any hyperfunctioning adenoma is its tendency to produce its hormone irrespective of the needs of the body for this hormone The remaining nonadenomatous endocrine tissue of the type from which the adenoma took its origin can be expected to hypofunction This remaining nonadenomatous tissue may be functionally inadequate or be actually atrophic on histologic examination By tiding the patient over the crisis with the administration of potent adrenal extracts and by concentrating the sodium ions in the body, it has been our experience that eventually the nonadenomatous endocrine tissue will regain its capacity to produce a sufficient amount of hormone to meet the needs of the body as regeneration occurs In brief, postoperative adrenal insufficiency should be anticipated and should be prevented by continuous treatment throughout the postoperative period , during the entire postoperative period the patient should be watched carefully for any premonitory signs of acute adrenal failure Among the more important signs of such failure are anorexia, hiccup, nausea, vomiting, weakness, insomnia, apathy or restlessness, an increasing pulse rate and a falling blood pressure Pyrexia accelerates the development of adrenal insufficiency and is therefore poorly tolerated These clinical manifestations may precede any material change in the chemical composition of the blood The blood pressure should be recorded every four hours and the concentration of blood sugar, plasma chlorides and blood urea should be determined daily If, at any time, the condition of the patient is the least suggestive of adrenal insufficiency, more vigorous treatment should be instituted or treatment should be resumed if it has been discontinued It is not generally appreciated that fatal adrenal failure can develop within a few hours In consequence of this fact it is easy for the physician to be lulled into a false sense of security A good rule of thumb to remember is that danger lies in under treatment rather than in overtreatment "

This was a great advance, for when the need of substitution therapy with adrenal cortical extracts was recognised Kendall was able to supply the extracts Administration of the adrenal cortical extracts with other measures, such as large quantities of solutions of sodium chloride and sodium citrate and a low-potassium diet, have been of great benefit By these means we have been able, since the death of the patient operated on in 1923, to prevent other deaths from adrenal insufficiency in cases in which hyperfunctioning tumours have been removed

In former cases of adrenal cortical tumour and of adrenal cortical hyperplasia 40 ml of aqueous adrenal cortical extract has been administered intramuscularly the evening before the operation and again just before the operation If a cortical tumour is removed, or the second subtotal adrenalectomy is being done for hyperplasia, 20–50 ml of aqueous adrenal cortical extract is given intravenously in a litre of saline solution during the operation Intramuscular and intravenous injections of the solution are continued for several days as indicated

Latterly in cases in which subtotal adrenalectomy has been done for hyperfunction and for adrenal cortical tumour, cortisone has been successfully used in place of the aqueous adrenal cortical extract for both preoperative and postoperative care The dose of 200 mg has been given intramuscularly forty eight and twenty four hours before operation and on the morning of the operation When doses of cortisone are discontinued, nausea, vomiting, anorexia, fever, and tachycardia tend to develop, but relief may be obtained by giving further cortisone Cortisone also has been effective in the treatment of the delayed reaction characterised by loss of appetite, weakness, and weight loss from six to ten weeks following operation

CASE RECORDS

To illustrate the measures taken I report here the last 2 cases of Cushing's syndrome on which I operated

Case 1 —A youth, aged 17, was first seen at the Mayo Clinic on June 4, 1951 His chief complaints were weakness and failure to grow for three years. Testosterone had been given elsewhere because of infantile genitalia and the absence of secondary sex characteristics

On physical examination at the clinic the patient was 54 in tall and weighed 128 lb He was of the Hercules build and had no slenderness of extremities He had a round face, florid complexion, striæ on the thighs, and a cervicothoracic hump

Laboratory studies revealed 9800 leucocytes per c.mm., 13% of which were lymphocytes, Hb 15 g per 100 ml., and the erythrocyte sedimentation rate (E S.R) 5 mm. in 1 hr (Westergren) An excretory pyelogram showed nothing of significance, and radiography of the hand indicated a bone age of 15 years, and of the skull showed evidence of osteoporosis The urine was alkaline The serum sodium and serum potassium levels were normal, the basal metabolic rate (B M R) was −17%

Operation —Adrenalectomy of 2 8 g (85%) of the left adrenal gland was done on June 14, the tissue removed showed adrenal cortical hyperplasia On June 20 total right adrenalectomy was carried out, 3 7 g of practically normal adrenal tissue being removed The values for 17 ketosteroids and corticosteroids in urine before and after operation were as follows

Date 1951	17 ketosteroids (mg per 24 hr)	Cortico steroids (mg per 24 hr)	Œstrogen (int units per 24 hr)
June 7	8 1	1 34	6
,, 12	8 2	1 06	
,, 14	Left adrenalectomy		
,, 26	5 5	1 36	
,, 29	Total right adrenalectomy		
July 26 *	0 6	0 32	

* Leucocytes 6800 (29 % lymphocytes)

Blood pressure before operation was 120 mm. Hg systolic and 70 mm diastolic, and after the operation 80–90 mm systolic and 55–60 diastolic Four weeks after operation there was anorexia, nausea, repeated emesis, and much weakness The patient was given glucose and saline solutions parenterally There was no difficulty in maintaining normal plasma chloride levels , so no deoxycortone acetate was given, but cortisone 25 mg was given every day for nine days. Other doses of cortisone are as follows for two days before and on the day of the first operation 100 mg was given three times a day , for two days before the second operation 200 mg was given each day , and on the second postoperative day 100 mg was given. The patient was sent home six weeks after the second stage, when he was taking cortisone 6 25 mg three times a day, and was on a no extra sodium diet (about 2 g of sodium daily)

Follow up —On Dec 28 this patient returned to the clinic for re-examination He had grown taller and had lost the appearance of having Cushing's syndrome Laboratory studies showed 52 mg urea per 100 ml of blood, 13 m eq. of serum sodium per litre, and 2 6 mg of 17 ketosteroids per twenty four hours We recommended that he continue to take 6·25 mg of cortisone every twelve hours by mouth and in addition 2 mg of deoxycortone

Case 2 —A man, aged 40, gave as his chief complaint weakness of two months' duration. He had had hypertension, with blood-pressure 185 mm Hg systolic and 120 mm. Hg diastolic for a year He had gained 20 lb in the same period. An appearance like that of Cushing s syndrome had developed in the two years before admission, as shown by snapshots

Physical examination showed a patient with rotund plethoric facies, multiple striæ, thin skin, acne, obesity of the trunk and supraclavicular fat pads, but no cervicothoracic hump He bruised easily

Laboratory studies showed Hb 13·4 g per 100 ml and ucocytes 10 000 per c.mm. (lymphocytes 14%) E.S.R mm. in 1 hr (Westergren) Glycosuria was graded 1 and e fasting blood-sugar was 135 mg per 100 ml the serum dium, potassium, calcium, and phosphorus levels were ormal. Excretory pyelography showed no abnormality he electrocardiogram gave evidence of coronary disease he B.M.R. was −2%. The value for protein bound iodine was 3 μg. per 100 ml The value for pituitary gonadotropin was 5 rat units per litre of urine

Operation.—On May 14 left adrenalectomy was carried out 7 g (80%) of adrenal tissue being removed The tissue emoved showed cortical hyperplasia. On June 4 total right drenalectomy was performed 9·1 g of adrenal tissue showing drenal cortical hyperplasia being removed. The urinary xcretion of 17-ketosteroids and corticosteroids and the blood pressure before and after the operation were as follows :

Date 1951	17 ketosteroids (mg per 24 hr)	Cortico-steroids (mg per 24 hr)	Blood pressure (mm. Hg)	
			Systolic	Diastolic
May 1	14·8	1·98	180–160	110–90
" 14	Left adrenalectomy			
" 29	4·4	1·68	130–140	90–100
June 4	Right total adrenalectomy			
" 18	1·8	0·84		
July 5	1·7	0·89		
" 27	2·1	0·41	110–120	80–90
Aug. 8	3·2	0·52		

After operation the fasting value for blood sugar was 88 mg per 100 ml ; the B.M.R was −2% ; and 24% of leucocytes were lymphocytes Two weeks after operation a mild reaction developed and lasted about fourteen days it consisted in complete anorexia weakness severe nausea, and emesis on one occasion. Three weeks after operation the physical signs of Cushing s syndrome regressed and œdema and desquamation of the face and shoulders developed with generalised dryness of the skin, lessened bruising and mild pruritus. The patient left hospital six weeks after the second stage, consuming a general diet with extra salt. He had mild melanosis of face and neck and palmar creases. Cortisone was given as follows : 20 mg daily before the first operation and on the day of the first operation. For the second stage 200 mg was given daily for three days, including the day of operation ; then 100 mg was given daily for two days and finally 50 mg on the third day after operation.

Follow-up—In December 1951 letters from this patient s wife and a physician in his home locality stated that the patient had improved steadily but that pigmentation of the skin had increased Concentration of hæmoglobin was 13·0 g per 100 ml of blood, and the blood pressure was 92/70 mm. Hg The patient had returned to work in September and had not been absent because of illness.

SUMMARY

The development of our knowledge of the function of the adrenal cortex is in great part due to isolation and identification of potent steroid hormones, the effects of which when increased in amount have been shown to produce in animals most of the changes found in patients with hyperfunctioning lesions of the adrenal cortex

Methods of assay of urinary steroids have been developed which are helpful in differentiating between tumour and hyperplasia.

The administration of adrenal cortical extracts before during, and after operation has prevented deaths from adrenal cortical insufficiency after removal of hyperfunctioning adrenal cortical tumours

Kepler postulated after intensive study that the important part is taken by the adrenal glands in Cushing s syndrome with and without basophilic adenomas of the hypophysis. Subtotal adrenalectomy has been done in 29 cases at the Mayo Clinic with excellent remission of symptoms in 19 Adrenal cortical insufficiency in the immediate postoperative period has been controlled by the administration of potent extracts of the adrenal cortex and more recently by cortisone which has alleviated the delayed symptoms of nausea, vomiting, weakness and loss of appetite and weight which have appeared in some cases from two to four weeks after subtotal adrenalectomy for Cushing s syndrome

ADDENDUM

Since this report was written subtotal adrenalectomy has been performed for hyperfunctioning lesions of the adrenal cortex in 16 additional cases at the Mayo Clinic

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THE RESULTS OF PARTIAL GASTRECTOMY FOR PEPTIC ULCER

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Visick (1948a) reported the results of 500 partial gastrectomies for peptic ulcer His report is here brought up to date and extended to include the partial gastrectomies done by him from that time until his death in 1949 There are slight differences in the figures compared with Visick s since patients operated on before 1941 are not included because they were not known personally to me Further the present figures refer only to patients who survived operation and attended the follow up clinic

Although the system of follow up and clinical assessment has been described previously (Visick 1948b) a brief summary here is desirable Patients first attended the follow up clinic six months after the operation and since then they have been seen at six month intervals If for any reason a patient cannot attend he is asked to complete a questionnaire. If his reply corresponds to our previous knowledge of his condition it is accepted for classification but if there is any significant variation he is either visited in his home or asked to make a special visit to hospital. By this means it has been possible to keep in touch with most of the patients and the follow up is 97·5% complete only 16 patients having been lost even those now recorded as lost have been seen for an average of 2·9 years since operation

TABLE I—AGE INCIDENCE AND TYPES OF ULCER

Age (yr)	Men					Women				
	G U	D U	G /D *	R U	Total	G U	D U	G /D	R.U	Total
20 or less	0	4	0	0	4	0	2	0	0	2
21–30	0	44	1	2	47	0	9	1	0	10
31–40	15	128	6	11	160	5	14	1	1	21
41–50	22	164	12	19	217	4	16	1	1	22
51–60	24	59	11	6	100	10	6	5	0	21
61 or more	10	11	1	2	24	4	1	0	0	5
Total	71	410	31	40	552	23	48	8	2	81

* G /D implies an active gastric and an active duodenal ulcer

Each patient is assessed by a board Although only one member (C N P) of Visick's original board remains, the assessment throughout the years has probably remained constant The present board consists of Mr J H Conyers, F.R.C.S, Mr R A Hall, F.R.C.S, Dr D Laing, and Dr C N Pulvertaft The assessment is based on a system designed to combine the clinical result with the ability to work and take part in the usual social activities The classification is as follows

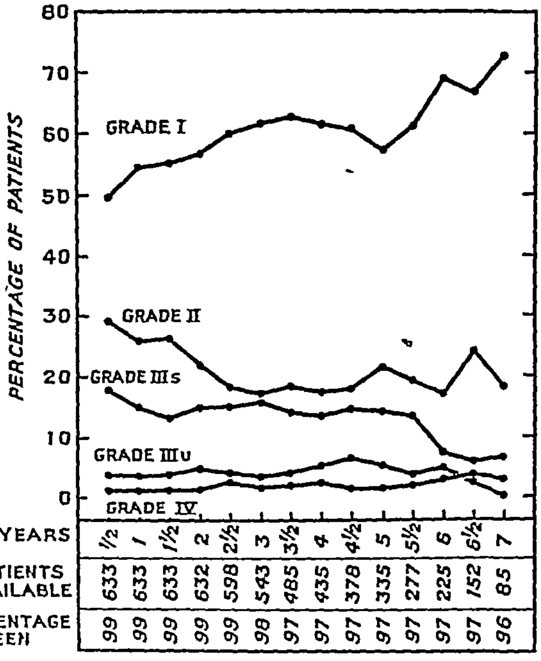
Grade I No gastric symptoms (fullness after an extra large meal is allowed)

Grade II No pain, mild occasional symptoms easily controlled by care, care implies limitation of size of meal, rest, and avoidance of certain articles of diet

Grade III mild symptoms not controlled by care slight abdominal discomfort This grade is subdivided as follows grade IIIs, satisfactory (both the board and the patient are satisfied with the result, symptoms do not interfere with the enjoyment of life or with work), and grade IIIu, unsatisfactory (either the board or the patient is not satisfied with the result, either the symptoms or the care taken to avoid them interferes with the patient's enjoyment of life or his efficiency at work)

Grade IV not improved, severe symptoms

The grade is determined by the combined board and not by any individual member, which system tends to eliminate any personal bias



YEARS	1/2	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7
PATIENTS AVAILABLE	633	633	633	632	598	543	485	435	378	335	277	225	152	85
PERCENTAGE SEEN	99	99	99	99	99	98	97	97	97	97	97	97	97	96

Fig 1—Results of six monthly follow-up examinations of whole series after partial gastrectomy for peptic ulcer

CLINICAL MATERIAL

Only patients who had a Polya type of operation are included in this report, of whom 632 (551 men and 81 women) attended the follow-up clinic. One male patient with a duodenal ulcer developed a recurrent ulcer and had a secondary and more extensive gastrectomy, after which he was transferred to the recurrent-ulcer group and so is presented twice in the tables One man and one woman who developed recurrent ulcers after Billroth I resections for duodenal ulcers are included in the recurrent ulcer group after the time of their conversion into a Polya, Of the remaining recurrent ulcers 2 followed partial gastrectomy done outside York, and 36 gastroenterostomy

The distribution according to type of ulcer and age is shown in table I

The type of operation was a Polya with an antecolic antiperistaltic anastomosis * (some of the early cases had an isoperistaltic anastomosis, but they are included because there is no significant difference in the results) The extent of the resection has varied from $^2/_3$–$^3/_4$ in the early cases to the full measured radical gastrectomy (Visick 1948a) where the stomach remnant measured $1^1/_2$–2 in along the lesser curve and 3 or 4 in along the greater curve for duodenal ulcers, and about 2×5 in for gastric ulcers, the resection being, on the whole, rather less extensive in women than in men Visick developed this extensive resection to prevent recurrent ulceration This series may be divided into three groups according to the extent of resection.

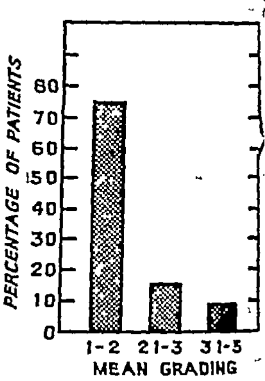


Fig 2—Mean grading of whole series (average time since operation 4 75 years)

Group 1 $^2/_3$–$^3/_4$ gastrectomy

Group 2 developing measured radical gastrectomy (D M R G)

Group 3 full measured radical gastrectomy (M.R.G)

The difference between the second and third groups is only a matter of degree The distribution is shown in table II

PRESENTATION OF RESULTS

The results may be presented in various ways

(1) By a graph showing the percentage of patients in each grade at six month intervals This method is adopted to show the whole series (fig 1), but its value is limited because it gives but little idea of the individual reaction to gastrectomy, since it does not indicate whether a patient's grade has remained constant or varied from period to period Further, a statement of the results, say, five years after operation does not take into account the condition before or after that time

(2) *Mean Grading* —For this method the grades are given the following scores grade I = 1, grade II = 2, grade IIIs = 3, grade IIIu = 4, and grade IV = 5 Therefore a patient seen for three years with grading of IIIs, II, II, II, I, and II would have a mean grading of 2 This system probably gives the best summary of the patient's response to operation, and a mean grading of 1–2 may be taken as a good or very good result, 2 1–3 as satisfactory in that although a patient may have symptoms these have been relatively mild and over a period of years the patient has derived benefit from the operation, and 3 1–5 as failures This is probably the best method for comparing large groups of patients, but with smaller numbers it is likely to give misleading figures The results are given in fig 2

(3) For comparing groups of patients the sum of the individual grading for the half years at risk of each group

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* Attachment of the proximal loop to the lesser curve of the stomach

TABLE II—DISTRIBUTION ACCORDING TO EXTENT OF RESECTION

Ulcer	Men				Women			
	²/₃–³/₄	D.M.R.G.	M.R.G	Total	²/₃–³/₄	D.M.R.G	M.R.G	Total
G.U	16	18	37	71	5	6	12	23
D.U	78	129	203	410	4	15	29	48
A.U.	9	11	11	31	0	4	4	8
R.U.	7	17	16	40	0	1	1	2
Total	110	175	267	552	9	26	46	81

may be compared on a percentage basis. This method, at least for small groups, gives a more accurate picture than does the mean grading Grades I and II are combined as are III and IV because they represent respectively the degrees of success or failure—the figures are presented as a percentage of the "½ years actually recorded

CAUSE OF POSTOPERATIVE SYMPTOMS

The postoperative symptoms that give rise to these gradings are many and varied, but most of them can be considered under one of three headings

(1) *Recurrent Ulceration*

In the present series there were three recurrent ulcers in men after a ²/₃–³/₄ resection one in the duodenal ulcer group and two in the recurrent ulcer group Two other recurrent ulcers, one in a man and one in a woman followed Billroth I resections and were treated by secondary extensive Polya resections, after which they were included in the present figures. So far as we know no recurrent ulcer has followed the more extensive resections

(2) *Mechanical Causes*

These were described by Visick (1948b) and since then no further instances have been found

(3) *Physiological Symptoms*

These symptoms have been attributed to different causes by different workers. I believe that the postprandial symptoms are the direct natural result of the disordered physiology which follows the removal of the 'reservoir' function of the stomach and the anastomosis with the jejunum which short-circuits the duodenum for there is then a free and rapid entry of non isotonic food into the jejunum This disturbance in the physiology of normal digestion gives rise to the postprandial symptoms the sensation of fullness regurgitation of bile and the train of symptoms which for convenience, may be called the early dumping 'syndrome and the alteration in the blood-sugar curves which result in the late postprandial hypoglycæmic symptoms together with the vitamin deficiencies the microcytic anæmias, and the loss of weight.

TABLE III—INFLUENCE OF AGE ON GRADING

Grade	Age-group		
	0–30	31–50	51–70
I and II	81 8%	82·6%	78 1%
III	13·4%	12 8%	14·6%
III and IV	4 8%	4·6%	7 3%
Possible "½ years"	104	923	233
% recorded	96·0	98	100

Although regurgitation of bile is associated with the other postprandial symptoms in about 60–65% of instances in this series it is considered to be of different ætiology

Regurgitation of bile is seen in three types and is a regurgitation rather than a true vomit

Type 1.—Patients complain of vomiting about a mouthful of bile usually [illegible] 30 minutes but sometimes an hour after [illegible] rare for food to be returned with the bile The regurgitation is sometimes, but by no means always associated with nausea If nausea is experienced it is relieved as soon as the bile has been vomited and the patient then feels perfectly fit Most patients say they have little warning of it Regurgitation usually takes place after the main meal of the day but may be associated with any meal Some patients associate it with a definite food—*e.g.*, eggs, particularly if fried—but usually no particular food can be singled out as the cause

Type 2—Patients who vomit one or two cupfuls at intervals of 4–6 weeks The vomit is practically always pure bilious material and not mixed with food These patients say they know when they are likely to vomit because they feel off colour for a day occasionally longer beforehand They obtain immediate relief as soon as the bile has been vomited

Type 3—Patients who regurgitate a small quantity of bile about once in every month or two usually but not always after an extra large meal

The causation of types 1 and 2 is thought to be different type 1 being due to the stomach remnant s rejection of the sudden high concentration of bile pancreatic juice &c, and type 2 to intermittent obstruction of the afferent loop, probably at the afferent stoma.

TABLE IV—INFLUENCE OF AGE ON POSTPRANDIAL SYMPTOMS

Age-group	No of patients	No symptoms	Dumping			Regurgitation of bile		
			Minor	Major	Total	Minor	Major	Total
0–30	23	56 5%	26·0%	13 0%	39·0%	4 35%	8 7%	13·05%
31–50	140	63·6%	19 3%	12·9%	32 2%	10·0%	6·0%	16·0%
51–70	36	55 5%	19·4%	13 9%	33 3%	13 9%	11 1%	25·0%

The percentages come to more than 100 because 60–65% of cases of bilious regurgitation are combined with dumping

There is a further small group of patients who vomit mixed food and bile but this is probably due to a different cause since in the occasional example that has been seen it has been associated with a long afferent loop into which food enters freely and where it stays until it is vomited

This symptom may cause only a mild degree of discomfort, but in some cases it gives rise to considerable inconvenience and distress The incidence is therefore reported under major and minor symptoms.

Early 'Dumping" Syndrome—The term 'dumping" is unfortunate The incidence of the syndrome depends very largely on its interpretation; this is probably why some observers report it at 75% (Muir 1949) and others deny its existence The syndrome is defined here as a sensation of postprandial fullness associated with a combination of two or more of the following symptoms: nausea dizziness palpitations perspiration headaches, fatigue, and drowsiness, which are often associated with eructations and develop within half an

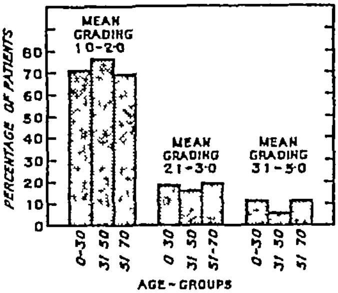

Fig 3—Influence of age on mean grading of men who have undergone M.R.G. for duodenal ulcer (average time since operation 3·6 years for age-groups 0–30 and 31–50 and 3·5 for age-group 51–70)

TABLE V—INFLUENCE OF EXTENT OF RESECTION ON GRADING

Grade	$^2/_3$–$^3/_4$ gastrectomy	D M R G	M.R G
I and II	84 2%	78 6%	82 6%
IIIs	10 2%	15 4%	12 7%
IIIu and IV	5 6%	6 0%	4 7%
Possible ' $^1/_2$ years "	851	988	922
% recorded	97 9	99	98

hour after a meal The nature and severity of the symptoms vary very considerably in different people, and, although the full syndrome is rare, lesser degrees are very common In fact if patients are carefully questioned (which is not always desirable) even those who claim to be completely symptom-free will confess to having at some time experienced mild symptoms or of having made some minor modification in their diet, or in their mode of eating, or of resting after a meal The true incidence is therefore probably 100% In the same way that it is difficult to assess what any person may mean by " pain," so it is difficult to assess the severity of " dumping ", any classification must of necessity be rough, with a considerable overlap between the groups However, with this proviso, the series may be divided into three groups

TABLE VI—INFLUENCE OF EXTENT OF RESECTION ON POST PRANDIAL SYMPTOMS

Extent of resection	No of patients	No symptoms	Dumping			Regurgitation of bile		
			Minor	Major	Total	Minor	Major	Total
$^2/_3$–$^3/_4$ gastrectomy	62	67 7%	16 1%	11 3%	27 4%	9 7%	6·4%	16 1%
D M R.G	90	57 8%	20 0%	15 5%	35 5%	15 5%	10 0%	25 5%
M R G	140	63 6%	19 3%	12 9%	32 2%	10 0%	5 0%	15 0%

(1) Those who do not complain of any symptoms apart from fullness after an extra large meal

(2) Those who complain of mild symptoms—i e, symptoms which do not interfere with the enjoyment of life, and which necessitate only very slight precautions

(3) Those who complain of more severe symptoms—i e, symptoms that cause the avoidance of even moderate meals and the rejection of certain articles of food, and necessitate special precautions, such as lying down for $^1/_2$ or 1 hour after a meal

In estimating the incidence only patients whose symptoms have either persisted for more than $1^1/_2$ years after operation or have developed after that time are included The figures would be considerably higher if the patients who experienced symptoms during the first $1^1/_2$ years only were included Though the onset of symptoms is usually immediately after operation, a few patients will first report symptoms three, four, or more years after operation In most instances the symptoms remain almost constant during the period of follow-up, but in others they vary considerably in severity, and in those it is possible to relate the periods of exacerbation with times of physical or mental stress There is good reason to believe that, although the basis of these symptoms is physiological, the incidence and severity are greatly influenced by (for want of a better term) psychoneurotic factors

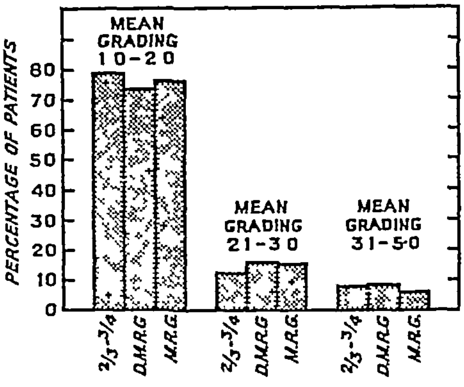

Fig 4—Influence of extent of resection on mean grading of men who have undergone gastrectomy for duodenal ulcer (average time since operation 6 7 years for $^2/_3$–$^3/_4$ gastrectomy, 5·4 years for D M.R.G and 3·6 years for M.R.G)

TABLE VII—RESULTS IN DIFFERENT TYPES OF ULCER IN MEN

Grades	G U	D U	G /D	R.U
I and II	88 3%	82 0%	88 2%	68 3%
IIIs	8 4%	12 9%	8 8%	21 5%
IIIu and IV	3 3%	5 1%	3 0%	10 2%
Possible ' $^1/_2$ years "	601	3860	320	380
% recorded	98 3	98	100	95 3

GENERAL RESULTS

The graph for the whole series (fig 1) shows that with the passage of time there is a tendency for the percentage of grade I to increase, grades II and IIIs to fall, and the failures, grades IIIu and IV, to remain relatively constant.

It might be said that the tendency for the results to improve with time is due to the poor results either dying or being lost That this is not so is shown by the last gradings of the 23 patients who died and the 16 who were lost

Grade I, 58 8%
Grade II, 23 2%
Grade IIIs, 12 8%
Grade IIIu, 5 2%
Grade IV, nil

The mean grading (fig 2) shows that 74 7% are " good " or " very good," 16 3% " satisfactory," and 9 0% " poor " results or failures

If the full series is considered 59 4% report no postprandial symptoms, 22 1% have bile regurgitation, and 32 7% " dumping " symptoms (in 14 3% the symptoms are combined) Of these, however, only 9% and 13 5% respectively are of major degree

INTERCURRENT DEATHS

Up to July 1, 1951, 23 patients have died since operation, the cause of death and the time after operation being as follows

	Sex	Age (yr)	Time since operation (mths)
Cardiovascular system			
(1) Cardiac failure	M	68	30
(2) Cardiac failure	M	60	12
(3) Cerebral hæmorrhage	M	52	28
(4) Cerebral hæmorrhage	M	76	26
(5) Cerebral hæmorrhage	M	54	39
Respiratory System			
(1) Bronchopneumonia	M	60	15
(2) Lung abscess	M	54	13
(3) Pulmonary tuberculosis	M	38	12
(4) Pulmonary tuberculosis	M	62	36
(5) Pulmonary tuberculosis	M	43	26
(6) Pulmonary tuberculosis	F	59	24
(7) Pulmonary tuberculosis	M	53	49
(8) Pulmonary tuberculosis	M	39	54
(9) Pulmonary tuberculosis	M	45	18
Central nervous system			
(1) Tuberculous meningitis	M	50	26
(2) Cerebral tumour	M	45	60
(3) Cerebral tumour	M	54	20
Malignant Disease			
(1) Carcinoma of stomach	F	52	65
(2) Carcinoma of gall bladder	M	53	24
(3) Carcinoma of uterus	F	63	46
(4) Carcinoma of cervix	F	45	24
Accidents			
(1) Car accident	M	41	7
(2) Car accident	M	46	32

Visick (1948a) reported two deaths from carcinoma of the gall-bladder, one of these followed gastrectomy for

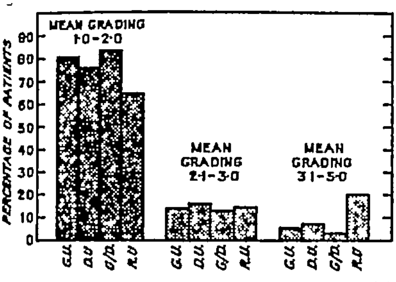

Fig 5—Influence of type of ulcer on mean grading of men.

a gastric ulcer which showed malignant change and as such is not included in the present series

The main point of interest is the high incidence of tuberculosis, 7 patients dying of pulmonary tuberculosis and 1 of tuberculous meningitis Of these, 2 were known to have pulmonary tuberculosis before operation in 1 of them Visick was persuaded to operate because of intractable abdominal pain, and the second operation was for a severe hæmatemesis in a patient whose tuberculosis was considered to be quiescent, but he went rapidly downhill and died eighteen months later In addition to these another patient has developed extensive pulmonary tuberculosis, and yet another is reported from elsewhere to have had a hæmoptysis with infiltration of both upper lobes. Little has been published about an association between gastrectomy and tuberculosis, but Bruusgaard (1946) reports 4 such instances out of 14 deaths after discharge from hospital Ranson (1947) 3 out of 47 intercurrent deaths, and Mimpriss and Birt (1948) 1 out of 12 deaths. Gaviser (1948) reported 2 one from tuberculosis and another from 'pulmonary hæmorrhage.' This association may however be important and related to the recognised loss of weight following gastrectomy

TABLE VIII—INCIDENCE OF EARLY DUMPING SYMPTOMS AND REGURGITATION OF BILE IN MEN

Type of ulcer	No of patients	No symptoms	Dumping			Regurgitation of bile		
			Minor	Major	Total	Minor	Major	Total
G.U	71	67·6 %	18 3 %	5·6 %	23 9 %	8 4 %	9 8 %	18 2 %
D U.	416	61·5 %	20 1 %	12 8 %	33 0 %	11 5 %	7 1 %	18·6 %
G./D.	31	74·2 %	3 3 %	16 0 %	19 3 %	3·6 %	6·4 %	10·0 %
R.U.	40	43·6 %	17·0 %	25·6 %	43·5 %	17 9 %	20 5 %	38·4 %

INFLUENCE OF AGE ON RESULTS

The men who have had a standard resection (M R.G) for duodenal ulcer have been divided into age groups 0–30 31–50 and 51–70 (tables III and IV and fig 3) Table III shows that there is little difference between age-groups 0–30 and 31–50 but there is a slight increase in the failure-rate for the age group 51–70 The mean grading and the incidence of postprandial symptoms suggest that the extremes of age do not respond quite so well as the middle age group The numbers in the age groups 0–30 and 51–70 are small and it is doubtful if there is any real variation with age but to avoid any possibility of error, the age-group 31–50 alone is used for comparing extent of resection (see below)

TABLE IX—COMPARISON OF RESULTS IN MEN AND WOMEN

Grade	G U and G /D		Duodenal		Total	
	Men	Women	Men	Women	Men	Women
I and II	88 2 %	69 1 %	82·0 %	66 2 %	83 7 %	67 3 %
IIIa	8·6 %	22·9 %	12 9 %	20 5 %	12 5 %	21·4 %
IIIb and IV	3 2 %	8 0 %	5 1 %	13 3 %	4 2 %	11 3 %
Possible patient-years	920	382	3860	473	4780	705
% recorded	99	97·6	98	99 3	98 2	98·6

INFLUENCE OF EXTENT OF RESECTION ON RESULTS

Men aged 31–50 operated on for duodenal ulcer are used to show this (tables V and VI and fig. 4)

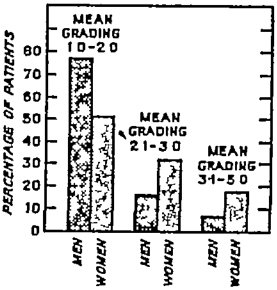

Fig 4—Influence of sex on mean grading excluding recurrent ulcers (average time since operation 4·73 years for men and 4·5 years for women)

The clinical results are shown to be very similar, but the middle age group is not quite so good as the other two

The incidence of postprandial symptoms is higher for D M R G than for either $^{2}/_{3}$–$^{3}/_{4}$ gastrectomy or M R.G Though the incidence of dumping is slightly higher that of regurgitation of bile is slightly lower in M.R.G than in $^{2}/_{3}$–$^{3}/_{4}$ gastrectomy It is doubtful if these figures are really significant, but they suggest that there is a slight tendency for an increase in dumping with the increased resection This however does not explain the higher incidence for D M R G than for M.R.G ; possibly this may be due to errors in the preoperative selection which was not so careful for D.M R.G as for the other two operations. As previously mentioned there are reasons for believing that although the basis of postprandial symptoms is physiological there is also a large psychoneurotic element in it

If all the ages are considered the percentages vary slightly but the general picture remains the same

TABLE X—COMPARISON OF POSTPRANDIAL SYMPTOMS IN MEN AND WOMEN

Sex	No of patients	No symptoms	Dumping			Regurgitation of bile		
			Minor	Major	Total	Minor	Major	Total
Men	512	63 2 %	19 0 %	12·0 %	31·0 %	16 0 %	7·4 %	23·4 %
Women	9	43·0 %	23 7 %	17 7 %	40 4 %	26 6 %	12·6 %	39·2 %

RESULTS IN DIFFERENT TYPES OF ULCER IN MEN

Since there are no gross discrepancies in the ages or types of ulcer in the resection groups, it is reasonable to include the whole series for comparing the results in different types of ulcer in men

Table VII shows that the clinical results for gastric ulcer and gastroduodenal ulcer are identical and slightly better than those for duodenal ulcer but the difference is only one of degree. Recurrent ulcers give appreciably less satisfactory results

The mean grading method (fig 5) leads to similar conclusions, although the numbers in the gastroduodenal and recurrent groups are small and therefore not so reliable The incidence of postprandial symptoms

TABLE XI—POSTOPERATIVE CHANGE OF WEIGHT IN MEN

Change in weight	No of patients	Mean grading
Gain of weight	32 (*8 0%*)	1 42
No change (±5%)	183 (*45 9%*)	1 52
5–10% loss	109 (*27 4%*)	1 73
10–15% loss	47 (*11 9%*)	1 66
15% loss or more	27 (*6 8%*)	2 11
Total	398	—

Average time since operation 3 5 yr

(table VIII) shows that dumping and regurgitation of bile are considerably commoner after recurrent ulceration than after the other types of ulcer, the incidence of dumping being rather greater for duodenal ulcer than for either gastric or gastroduodenal ulcer

COMPARISON OF RESULTS IN MEN AND WOMEN

There are only 2 women with recurrent ulcer, so, since it has been shown that there is an appreciable difference between this type and the other types, the comparison between men and women is based on the patients with gastric, duodenal, or gastroduodenal ulcer The ratio of gastric and gastroduodenal ulcers to duodenal ulcers was 1 4 in men and 1 1 5 in women, hence, if anything, this grouping should favour the women, but against this the extent of resection might have some influence, the proportions of $^2/_3$–$^3/_4$ gastrectomy, D M R G, and M R.G in men being 1 1 5 2 4, and in women 1 2 7 5

However, since the differences shown below become more pronounced if the comparison is confined to men and women in the M R G group, this criticism is not likely to be valid, nor is the effect of age likely to be significant

The results are shown in table IX and fig 6, both methods demonstrating that women respond less satisfactorily than men In the mean grading only 50 6% of women against 77 3% of men are "good" or "very good" results, and 17 8% of women against 6 7% of men must be regarded as "failures" The difference is not so great in the "$^1/_2$-year" method but it is still pronounced and holds good for both gastric and gastroduodenal groups and the duodenal group

A comparison of the figures in table IX and fig 6 is interesting because although women record 67 3% of grades I and II, only 50 6% manage a mean grade of 1–2, which suggests that there is a considerable tendency for individual women to alter their grading from time to time, which impression is confirmed by a study of the records

TABLE XII—POSTOPERATIVE CHANGE OF WEIGHT IN WOMEN

Change in weight	No of patients	Mean grading
Gain of weight	5 (*9 8%*)	1 82
No change (±5%)	14 (*27 4%*)	1 96
5–10% loss	6 (*11 8%*)	1 78
10–15% loss	20 (*39 2%*)	2·42
15% loss or more	6 (*11 8%*)	2 43
Total	51	—

Average time since operation 3 5 yr

Only 43% of women (table X) against 63 2% of men reported no postprandial symptoms, and the incidence for both "dumping" and regurgitation of bile is greater in women than in men This explains the main reason for the poor clinical result in women compared with men, but associated with it is the high proportion of women, particularly women who have not reached the menopause, who develop an iron deficiency anæmia compared with men

This difference in men and women is of great importance and underlines the necessity for very careful preoperative selection of women for gastrectomy

LOSS OF WEIGHT

It is well recognised that loss of weight commonly follows partial gastrectomy, but an assessment of the degree presents difficulties We have found that in some patients the immediate preoperative weight is below their average, whereas a few are above average, having recently gained weight owing to rest and a milk diet Therefore, although it is open to objection, we have taken the average weight over two or three years before operation as the standard weight, and have only included patients in which this was known and can be taken as being reasonably accurate Patients who have been known to have malignant disease or pulmonary tuberculosis have also been excluded The loss of weight is presented in table XI as a percentage, because it is considered that a loss of, say, 8 lb is more significant in a man weighing 8 stone than in a man weighing 13 stone The mean grading is also shown as an indication of the degree of symptoms in each group

TABLE XIII—CHANGE OF WEIGHT IN RELATION TO EXTENT OF RESECTION IN MEN OPERATED ON FOR DUODENAL ULCER

Change in weight	$^2/_3$–$^3/_4$ gastrectomy	D M.R G	M R G
	No of patients	No of patients	No of patients
Maintained or gained weight	39 (*72 2%*)	45 (*51 1%*)	77 (*49 3%*)
5–10% loss	8 (*14 8%*)	25 (*28 4%*)	49 (*31 5%*)
10–15% loss	5 (*9 3%*)	12 (*13 6%*)	21 (*13 4%*)
15% loss or more	2 (*3 7%*)	6 (*6 8%*)	9 (*5 8%*)
Total	54	88	156

Average time since operation
$^2/_3$–$^3/_4$ gastrectomy, 5 7 years
D.M R G, 3 7 years
M.R.G, 2 6 years

The results for women are shown in table XII

In the mass there does tend to be a relationship between the degree of weight loss and the postoperative symptoms, and this holds for both men and women, but this is by no means true of individuals, because some patients with a mean grading of 1 show much loss of weight, whereas others with pronounced symptoms have maintained their weight

There is also a greater tendency for women to lose weight, only 37 2% of women have maintained or gained weight against 53 9% of men

It has been shown that there is a general relationship between the loss of weight and the degree of postoperative symptoms, therefore in comparing the weight loss with the extent of the resection it is important to compare groups of similar types and for this purpose male duodenal ulcers have been selected (table XIII) To make this comparison absolutely accurate the mean grade for each group should be identical, in fact it is very slightly higher for the D M R G and the M R G, than the $^2/_3$–$^3/_4$ gastrectomies This difference is small, and even if the comparison is limited to patients with a mean grade of 1–2 the figures remain substantially the same, and the findings are therefore probably valid

The figures for the D M.R G and for M R G are very similar, as might be expected, because the difference in the extent of resection is small, but both these series show an appreciably greater loss of weight than does the series of $^2/_3$–$^3/_4$ gastrectomy There therefore seems to be a relation between the extent of the resection and the amount of weight lost

The average time since operation varies from 5 7 years for the $^2/_3$–$^3/_4$ gastrectomy to 2 6 years for M R G This, From further recent investigations, using *p*-oxypropiophenone (a synthetic compound, which inhibits some fractions of the anterior lobe of pituitary), Costa and Ferrari[17] concluded that this gland plays no part in the inhibition of hyaluronidase by salicylates

I report here the results of experiments showing that salicylates are effective in inhibiting hyaluronidase in vivo when the pituitary and adrenal glands are intact

MATERIALS AND METHODS

Fourteen ‡ male albino rats, weighing 160–200 g at the beginning of the experiments and belonging to the same colony, were used They were fed on a diet of bread, milk, fresh vegetables and water, ad libitum Experiments were begun after the rats had been kept three or four days in the laboratory

Purified hyaluronidase ('Jalovis' Vister), of which 1 mg corresponds to 125 viscosimetric units was used, 1 mg of hyaluronidase powder being dissolved in 2 5 ml of 0·9% saline solution, and 0·10 ml of the solution (equivalent to 5 visc u) being injected intradermally

The rats backs were accurately depilated with bent scissors twenty four hours beforehand The amount of dermal spread was tested by injecting into symmetrical zones of the rats' dermis 0 2 ml. of a mixture of equal parts of hyaluronidase and of a suspension of indian ink in distilled water on the right side, and 0 2 ml of a mixture of equal parts of saline solution and of the same suspension of indian ink in distilled water on the left side The mixtures were prepared a little before the experiment started The surface areas of spread were measured immediately after intradermal injection and again at intervals of 30 60 and 120 minutes.

A 1% solution of pure sodium salicylate in distilled water was made, and of this 10 ml (100 mg) per kg of body weight were given intravenously 15 minutes before the intradermal injection of hyaluronidase

In four control intact rats the dermal spread was assessed before and after the administration of sodium salicylate. Six rats were hypophysectomised by the parapharyngeal route under alcohol ether chloroform anæsthesia and the amount of spread was tested 6 and 9 days after the operation to exclude any effect of operation trauma, which is well known to inhibit hyaluronidase[14 15 24 26] and to get rid of all pituitary hormones in the body The success of the operation was proved at necropsy after the end of the experiments Two rats, under the same form of anæsthesia, were aseptically adrenalectomised transperitoneally and the amount of spread was tested 3–6 hours after the operation since the survival to bilateral adrenalectomy is short. As controls two rats underwent median laparotomy and had their abdominal viscera traumatised about as much as in the adrenalectomised rats.

RESULTS

The results, summarised in tables I, II and III, show that

1 In intact rats salicylates inhibit both the spontaneous spread and (much more) that due to hyaluronidase (table I)

2 After hypophysectomy the spontaneous spread increases, (table II, experiments 5 6 and 8)

3 Hypophysectomy does not seem to modify the spread due to hyaluronidase (table II)

4 Salicylates reduce the spontaneous spread in hypophysectomised rats (table II experiments 5 6 9 and 10)

5 Salicylates reduce the spread due to hyaluronidase (though much less than in intact rats) as long as 6 days after hypophysectomy (experiments 5, 6 and 7) but not beyond 9 days (experiments 9 and 10)

6 Salicylates do not modify the spontaneous spread or that due to hyaluronidase in adrenalectomised rats.

7 In laparotomised rats salicylates do not modify the spontaneous spread though they largely inhibit the spread due to hyaluronidase

DISCUSSION AND CONCLUSIONS

The present experiments confirm that in vivo in rats salicylates inhibit the spreading of indian ink in the dermis by hyaluronidase, except after adrenalectomy[12] § or after hypophysectomy and that therefore the in vivo inhibition of hyaluronidase by salicylates is very likely related to the anatomical integrity and functional activity of the pituitary and adrenal glands

The inhibition of hyaluronidase action by A C T H and cortisone is not direct in fact, in vitro neither A C T H[27] nor cortisone[28] modifies hyaluronidase activity

TABLE III—INFLUENCE OF SODIUM SALICYLATE ON INTRADERMAL SPREAD OF INDIAN INK AFTER EITHER LAPAROTOMY OR BILATERAL ADRENALECTOMY IN RATS

Rat no.	Time from operation (hr)	Time from intradermal injection (min.)	Area of intradermal spread (sq mm)							
			Before sodium salicylate				After sodium salicylate			
			Ink + saline solution		Ink + hyaluronidase solution		Ink + saline solution		Ink + hyaluronidase solution	
				Increase (%)		Increase (%)		Increase (%)		Increase (%)
Laparotomised :										
11	2 and 4	1	114		149		121		125	
		30	137		353		137		170	
		60	(No data)		Unchanged		160		Unchanged	
		120	166	45	Unchanged	137	Unchanged	32	Unchanged	36
12	2 and 4	1	141		113		129		118	
		30	160		341		(No data)		134	
		60	(No data)		Unchanged		170		(No data)	
		120	166	17	Unchanged	201	179	38	151	28
			Average 31		Average 170		Average 35		Average 32	
Adrenalectomised :										
13	6 and 8	1	127		143		140		163	
		30	151		415		161		460	
		60	160		Unchanged		165		Unchanged	
		120	172	35	Unchanged	190	193	38	Unchanged	182
14	3 and 5	1	115		158		136		137	
		30	155		350		160		351	
		60	100		Unchanged		(No data)		Unchanged	
		120	Unchanged	30	Unchanged	121	182	33	Unchanged	176
			Average 37		Average 155		Average 35		Average 179	

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‡ In this number are not included the animals which died during the experiments.

§ On the other hand in mice adrenalectomy favours the dermal spread due to hyaluronidase[11] thickness of perspex The cell being made of a plastic material is not easily broken

The method of use is as follows

(1) 0 4 ml (or more if the patient is anæmic) of the patient's blood is diluted with 50 ml of 0 4% ammonia solution to give about a 0 12% solution of hæmoglobin

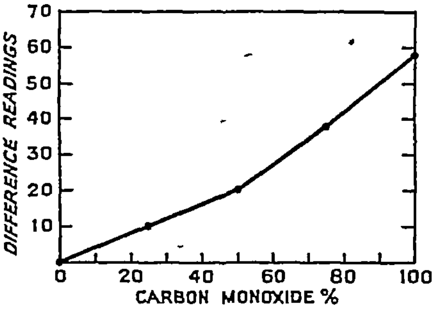

Fig 4—Example of graph obtained with new type of cell: difference readings" are obtained by subtracting the readings obtained on the instrument at each dilution from the reading at 100% oxyhæmoglobin

(2) The resulting solution is divided into three equal parts in well-stoppered containers labelled A, B, and C

(3) Pure oxygen is passed through solution B in bright daylight for three minutes = 0% CO

(4) Coal gas is passed through C in the dark for three minutes, and then a drop of ammonium sulphide solution is added to remove any free oxygen. This is now 100% CO A is left untreated as the unknown.

(5) Solution A is put into compartment A of the cell, solution B into compartment B, and solution C into compartment C The closely fitting lid is put on, making an airtight join with soft paraffin, and the cell is fitted into the holder of the spectrometer in the darkroom.

(6) The spectrometer is adjusted so that the slit is near the cell (and the source of light)

(7) With the eyes properly adapted to the dark, the slit diaphragm is closed so that the α band is as thick as the space between the α and β bands

(8) The means of several readings at 0, 25, 50, 75, and 100% carbon monoxide and also of the unknown solution are noted, care being taken that conditions of light, temperature, and dark adaptation remain the same

(9) A graph is constructed from the readings, and on this the concentration of carbon monoxide in the unknown solution is read off

Fig 4 shows the type of graph obtained with this cell, it will be seen that it is essentially similar to those obtained by the standard methods

The cell can, of course, be used for other estimations depending on the same principle

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RESULTS OF PROTRACTED TREATMENT OF IDIOPATHIC STEATORRHŒA

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THE effect of treatment on the excretion of fat in the fæces in idiopathic steatorrhœa has seldom been studied adequately, owing to the time required for accurate determination of the patients' fat-balances However, it is generally thought to be disappointing Davidson et al (1947) found that symptomatic improvement could be produced by treatment without any alteration in the degree of steatorrhœa, and Thaysen (1932a) described a case in which the excretion of fat continued to be abnormal long after the diarrhœa had improved

We have had a group of these patients under observation for many months In each the degree of steatorrhœa before treatment was known, and it was decided to see whether the symptomatic improvement which had taken place was accompanied by a decrease in the excretion of fat We were gratified to find that the excretion of fat had, in fact, decreased significantly

METHOD

Seven patients who had been treated for 9–42 months since the first estimation of the fat-balance were selected for investigation None of them had visited countries where tropical sprue is endemic, and in all of them pancreatic disease had been excluded because the excretion of nitrogen in the fæces was normal Every patient had had symptoms for more than three years, and one for ten years

The treatment given to each patient included a high protein low-fat low-starch diet, with calcium lactate 5–15 g, vitamin A 4000 I U, vitamin D 10,000 I U., and folic acid 20 mg daily by mouth Case 2, who had hypochromic anæmia also received ferrous sulphate gr 3 t d s At the end of the period of study all the patients were readmitted to hospital and subjected to a second estimation of the fat-balance

For the fat-balances the patients were given a test diet containing protein 70 g and fat 70 g daily Whenever it was possible, the stools were collected for three consecutive periods of four days, separated by carmine markers The total amount of fat in each four-day specimen of fæces was estimated by the method of van de Kamer et al (1949) The weight of the patient the level of hæmoglobin, and the number of stools passed daily were compared with the values recorded before treatment

TABLE I—EFFECT OF PROTRACTED TREATMENT WITH DIE AND VITAMINS, INCLUDING FOLIC ACID, ON IDIOPATHI STEATORRHŒA

Case no	Length of treatment (mos)	Weight (kg)		Hæmoglobin (g per 100 ml)		No of stools daily	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
1	42	56 1	60 0	11 7	12 4	5–6	1–2
2	28	55 2	58 2	9 2	12 2	2–3	1
3	28	54 4	57 5	9 6	17 6	1–2	1
4	20	52 2	62 4	12 1	13 8	1	1
5	24	44 1	45 6	8 9	13 2	4–5	3–4
6	23	41 6	40 2	8 5	13 9	1–2	1–2
7	9	54 5	68 8	11 8	13 7	1–2	1

For gain in weight during period of treatment
t for 6df = 3 77 p = <0 01

For increases in hæmoglobin during period of treatment
t for 6df = 3 73 p = <0 01

RESULTS

Table I shows that, during the period of treatment, in every patient weight was gained and the level of hæmoglobin increased to a significant extent All the patients noted some improvement in the form of the stools, but even after protracted treatment three of them continued to pass more than one stool daily

Table II gives the figures for the excretion of fat before and after treatment In every patient the percentage of dietary fat excreted was less after treatment, and the difference between the mean four-day excretions is significant In cases 4 and 7 the steatorrhœa had ceased, and the excretion of fat had fallen to less than 10% of the amount ingested, which is the upper limit of normal. The decrease in the steatorrhœa cannot be due to a lessening of intestinal hurry, for none of the patients had severe diarrhœa before treatment, and in cases 4 and 6 the improvement in the absorption of fat took place while the number of stools passed each day remained unchanged

DISCUSSION

The prognosis of idiopathic steatorrhœa is difficult to assess, because spontaneous remissions are not uncommon, but it is thought to be worse than that of tropical sprue Thaysen (1932b) collected twenty six published

TABLE II—EFFECT OF PROTRACTED TREATMENT WITH DIET AND VITAMINS INCLUDING FOLIC ACID ON EXCRETION OF FAT IN IDIOPATHIC STEATORRHŒA

Case no.	Length of treatment (mos.)	Dietary fat excreted during consecutive periods of four days (%)			
		Before treatment	4-day mean	After treatment	4-day mean
1	42	32 3	32 3	9·0 17·0 13·0	13·0
2	28	17 7 20 7 27 9	22 1	9·0	9 0
3	28	29 5 32 4 60 0	40·0	24·0 22·0 24·0	23 3
4	26	22·0	22·0	8·0 6·4 7·6	7 3
5	24	40·0	40·0	21·0 16·0 13 0	16 7
6	12	23·0	23·0	12·0 17·5 14 0	14 9
7	9	51·2 47·0 48 0	50 7	0 7 (twelve days pooled)	6 7

For mean 4-day excretion of fat before and after treatment
t for 6df = 4 75   p = <0·01

ases and added eight of his own Although a few had ad long remissions he was not confident that any had been cured. Of the thirty four patients ten had died the duration of the illness varying from one to twenty-one years, and in one case no information about the course of the disease was given Of the remaining twenty three patients seven were much improved, but four of these were still anæmic, and the condition of ten had remained unchanged or had grown worse Reports of the effect of treatment on the excretion of fat differ considerably Most of the earlier workers based their conclusions on the microscopical examination of the fæces for fat or on the percentage of fat in isolated specimens of stool, and therefore their results may be unreliable Thaysen (1932c) estimated the percentage of dietary fat excreted in three of his patients by a fat-balance technique and found that the absorption of fat improved in two of them after treatment, but in the third the steatorrhœa persisted unchanged during the four and a half years he was under observation

The present series of cases differs from those reported by other workers in the long period of observation and in the administration of folic acid throughout this period All our patients improved, and in every case the improvement was maintained during the period of study It is tempting to ascribe this result to the use of folic acid. Folic acid produces rapid clinical remission, with a decrease in the severity of the diarrhœa, and improvement in the anæmia if it is megaloblastic, but it does not affect the degree of steatorrhœa at least during the early weeks of treatment (Davidson et al. 1947, Weir and Comfort 1947, Ferguson and Calder 1948) The prompt symptomatic and hæmatological response to treatment implies that there is a deficiency of the vitamin in idiopathic steatorrhœa, and some experimental evidence for this was obtained by Spray et al. (1951) in their studies on the excretion of folic acid in macrocytic anæmia. The cause of the deficiency is not fully understood, but it may depend on bacterial competition for the vitamin within the lumen of the intestine (Frazer 1949) Folic acid may alter the intestinal flora and thereby decrease the fermentation of carbohydrate with resulting improvement in intestinal function

The mainstay in the treatment of steatorrhœa is still the provision of a suitable diet and the treatment of the deficiencies in vitamins and minerals which are likely to occur It could be argued that the improvement in the absorption of fat which we have observed after protracted treatment is due to this régime and not to a specific effect of folic acid Moreover, it is possible that patients tend to come under treatment when they are in an active phase of their illness and that in the natural course of events some improvement might be expected from non specific supportive therapy Such arguments could only be answered finally by the simultaneous study of a control group or by using the patients as their own controls with periods on and off folic acid Further experiments on these lines are desirable but they are very time-consuming

Meanwhile, it seems justifiable to conclude that, although our knowledge of the cause of the excessive excretion of fat is not yet complete modern methods of therapy can bring about a clinical and biochemical remission in patients with idiopathic steatorrhœa, and improvement can be maintained as long as they will cooperate in their treatment

SUMMARY

Seven patients with idiopathic steatorrhœa were treated with a high protein low fat low-starch diet with added calcium and vitamins, including folic acid, for 9–42 months

In every case clinical improvement took place and fat balances revealed a significant decrease in the excretion of fat.

In two cases the loss of fat in the fæces fell to within normal limits.

None of the patients relapsed during the period of study

The contribution of folic acid to these results is discussed

I wish to thank Miss Moira Aitken and Miss Beryl Brinkhurst for their assistance in the biochemical investigation, and Prof L J Witts for his advice and criticism at all times

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THE SIGNIFICANCE OF PALLOR IN THE SCHOOL-CHILD

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THIS paper describes an attempt to assess the significance of pallor in children who are otherwise apparently well It is based on the results of an intensive survey of about 1200 Cambridge school-children in the early part of the war Some of the results of the survey have already been reported (Yudkin 1944a and b), but circumstances made it impossible to present until now further analyses from the considerable data then accumulated The data included the results of clinical examination dental examination determinations of height weight hæmoglobin, and grip assessment of intelligence and educational attainment and measurements of visual acuity dark adaptation, vitamin C saturation and physical performance

The value of such an intensive survey where many measurements are made in the same persons has been discussed elsewhere (Yudkin 1949) By studying the relation between the items measured we can determine whether the pale child is likely to be tall or short or heavy or light, or to have good or bad teeth It is in this form that the results of this study are presented Since the most important finding was that there was little relation between pallor and level of hæmoglobin it was thought worthwhile to determine also what factors were related to the level of hæmoglobin

COLLECTION OF DATA

The children were boys and girls aged 4–11 years attending three schools at Cambridge. Although

TABLE I—SOME FACTORS NOT RELATED TO PALLOR

1 Level of hæmoglobin
2 Size of family
3 Vitamin-C saturation
4 Incidence of respiratory infection
5 Dental caries
6 Intelligence
7. Educational level
8 Dark adaptation
9 Vital capacity
10 Resting pulse rate
11 Breath holding
12 Endurance
13 Visual acuity
14 Skeletal defects
15 Skin defects .

Methods for assessing factors 9–12 are described by Jenkins and Yudkin (1943)

participation in this investigation was voluntary, all but three children in this age group took part

The children were weighed wearing only one undergarment The *clinical examination* was made by the school medical officer *Nutritional state* was graded as A, B, C, or D (excellent, normal, subnormal, or bad)

Pallor was recorded by clinical judgment—i e , from the degree of colour in the cheeks, lips, and conjunctivæ The skin was examined for such abnormalities as follicular keratosis, excessive dryness, and septic conditions Bony and postural defects were also recorded

The *dental examinations* were made by two school dental officers working together They recorded the presence and degree of caries, staining of the teeth, gingivitis, sepsis, and oral cleanliness

The *mental tests* were conducted in collaboration with Dr D R Davies, of the Cambridge Psychological Laboratory They consisted of Raven's "matrices" test of intelligence and the Northumberland test of educational attainment

Hæmoglobin was determined by the alkaline hæmatin method of Clegg and King (1942)

Visual acuity was measured with Snellen's type cards, and dark adaptation with the Crooks adaptometer (Yudkin et al 1943)

Further data were obtained from examination of the older children , these included vitamin-C saturation and tests of physical performance (Jenkins and Yudkin 1943)

TABLE II—PROPORTION OF PALE CHILDREN WITH LOW, MODERATE, AND HIGH LEVELS OF HÆMOGLOBIN

Hæmoglobin (g per 100 ml)	Percentage (and number) of children	
	Pale	Not pale
Less than 11	2 8 (*5*)	3 9 (*33*)
11–15	92 7 (*164*)	90 4 (*726*)
More than 15	4 5 (*8*)	5 7 (*47*)
Total	(*177*)	(*806*)

Correlation ratio, r = 0 00

To avoid complicating this report with detailed statistical data, results are usually said to be statistically significant when the probability is less than 1 in 20 ($p<0\ 05$) that a given correlation is due to chance Conversely, a probability greater than this is usually indicated as a lack of significant correlation

RESULTS

Pallor

Table I gives a list of factors found to be definitely unrelated to pallor Of these the most important was hæmoglobin This lack of relation between the level of hæmoglobin and the presence of pallor means that a child is likely to have the same level of hæmoglobin whether he is pale or not This is seen also in table II, which shows that the proportion of children with low or high levels of hæmoglobin was almost the same for children with pallor as for children without pallor

TABLE III—ASSOCIATION BETWEEN PALLOR AND WEIGHT, HEIGHT, TUXFORD INDEX, AND GRIP

	Difference in favour of children without pallor
Weight	2 2 kg
Height	1 54 cm.
Tuxford index	57 units
Grip	0 82 kg

Factors which seem to be related to pallor are given in tables III and IV Pale children are on the average 2 2 kg lighter and have a lower Tuxford index than children who are not pale (Tuxford 1942) They are also about 1 5 cm shorter and have a weaker grip Unlike the differences in weight and Tuxford index, the differences in height and grip are just outside the normally accepted limit of significance , the probability that they are due to chance is about 1 in 13, against the probability of 1 in 20 usually accepted as significant

There is a significant relation between nutrition and pallor (table IV) Thus pale children are most likely to be of nutrition grades C and D The implications of this finding are discussed below

TABLE IV—ASSOCIATION BETWEEN PALLOR AND GRADE OF NUTRITION

	Percentage (and number) of children	
	Pale	Not pale
Good nutrition (grades A and B)	70 7 (*140*)	89 2 (*790*)
Poor nutrition (grades C and D)	29 3 (*58*)	10 8 (*95*)
Total	(*198*)	(*885*

Correlation ratio, r = 0 42

Hæmoglobin

The level of hæmoglobin was not related to most o the items tested (table v) In other words, if a child had only about two thirds of the amount of hæmoglobi considered normal, he was just as tall and heavy and had as good teeth, bones, and skin as if he had the ful amount of hæmoglobin As we have seen, he als had just as much chance of being of good colour

The only item with which the level of hæmoglobi was related was the size of the family As has been explained earlier (Yudkin 1944b), in poorer families a increase in the number of children leads to a greate financial strain and hence is more likely to lead to malnu trition This is borne out by the findings in the poore junior school the children of larger families had a signifi cantly lower level of hæmoglobin (0 8% Haldane) tha those of smaller families, whereas in the other junio school the difference was less (0 14%) and not significan (see Yudkin 1944b)

DISCUSSION

Significance of Pallor

The brief account of these findings given previousl (Yudkin 1949) was followed by a somewhat similar repor of the lack of relation between hæmoglobin and pallo by Adcock et al (1950) These workers attempted t assess pallor more objectively than in the investigatio reported here, and matched the colour of the gum against coloured standards Although it would clearly be advantageous to have an objective measure of pallor, it is doubtful whether the technique used by Adcock et al can be considered entirely satisfactory A clini cian will usually judge pallor from the appearance of the lips, cheeks, and conjunctivæ , it is by no means certain that a diminution in the normal redness of these is always matched by a diminution in the colour of the gums Again, a redness of the conjunctivæ due to inflammation will readily be detected as such when the lips and cheeks are also inspected, but mild degrees of gingivitis, which is not at all uncommon, might easily

TABLE V—SOME FACTORS NOT RELATED TO LEVEL OF HÆMOGLOBIN

1 Pallor
2 Grade of nutrition
3 Height
4 Weight
5 Tuxford index
6 Grip
7 Skeletal defects
8 Skin defects
8 Dental caries
10 Inflammation of gums

remain undetected when only the gums are examined for colour

It is no doubt true that the clinical assessment of pallor has all the disadvantages known to be associated with such subjective examination see, for example Jones (1938) and Bransby and Hammond (1951) In spite of this we have adopted the clinical assessment of pallor for three reasons

(1) Though the variability in assessment may be appreciable there would nevertheless be a substantial proportion of children who would undoubtedly be placed by any observer at any time, in one or other category—i e some of the children obviously were pale and some as obviously were not. If there were any association between, say level of hæmoglobin and pallor it would have been possible to demonstrate this even in a slight degree

(2) There does not seem to be any generally acceptable way in which pallor can be assessed objectively rather than by the subjective impression on the observer of the relative absence of redness of lips cheeks and conjunctivæ

(3) The purpose of this investigation was to assess the significance of precisely this clinical and subjective method of judging pallor a method which is generally accepted and taught to every medical student Many clinicians are satisfied that they can say by inspection, whether a child is or is not pale and on this basis will treat the anæmia by oral or parenteral administration of iron or liver

From the results described it should now be evident that at least within the range of ordinary children of school age, pallor is no indication that anæmia is present The pale child is no more likely to be anæmic than a child of good colour with red lips and rosy cheeks

It should be emphasised that the findings reported here relate to children without any obvious disease It is known that appreciable degrees of anæmia, with levels of hæmoglobin of about 7 g per 100 ml (50% Haldane) or less, show themselves with undoubted pallor What this investigation demonstrates is that within the wide range of variation seen in apparently healthy children where the hæmoglobin varies from about 10 to over 15 g per 100 ml there was no relation between level of hæmoglobin and pallor

Although not associated with the level of hæmoglobin pallor is associated with low weight low Tuxford index low grading of nutritional state, and possibly also low stature and weaker grip The pale child seems to be generally a child of inferior physique. Pallor would on this view be more likely to be present in a child who shows relatively poor physical development Although this is the more likely explanation of these findings, there is an alternative explanation—namely, that the clinician tends to classify more readily the underdeveloped child as pale It would be easy on these lines to explain the association between pallor and low grade of nutrition on the assumption that the clinician adopts pallor as one of the criteria for classifying a child as of low nutritional grade. It would however be less easy though still possible, to imagine that the clinician also tends more readily to notice pallor in the slighter weaker child. On the whole it seems more reasonable to suppose that the association is real and that the physically underdeveloped child is more likely also to be pale.

Significance of Hæmoglobin Level

The finding that the level of hæmoglobin was apparently independent of nutritional state physique, or performance is somewhat surprising Low levels in this country are generally assumed to be most commonly due to dietary deficiency especially of iron and can often be raised by the administration of iron (Mackay 1933 Widdowson and McCance 1930) Persons with low levels of hæmoglobin are assumed not to be in optimal health and Mackay and Goodfellow (1931) have shown in infants that administration of iron not only raised the amount of hæmoglobin but also improved growth and decreased the incidence of infection It must be remembered, however, that the infants examined by Mackay were from a poor part of London and were studied during a period of low economic conditions. The level of hæmoglobin in these infants was, for example, lower than that in the Cambridge children hence it may be concluded that the lack of relation in this study between level of hæmoglobin and the other factors studied is not in contradiction to the findings of Mackay

It now remains to explain how a range of hæmoglobin from 10 to 15 g per 100 ml can be present in children with no apparent abnormality There are two possible explanations

(1) One is that this represents true physiological variation and that in many instances, neither iron nor any other substance is the limiting factor in the production of hæmoglobin This suggestion is supported by Darby et al. (1947) who showed that the absorption of iron by children was not related to their level of hæmoglobin the range of which in their subjects was about the same as in the children in this study

(2) The second is that the lower levels may not be maximal but are nevertheless adequate for all bodily functions This is supported by the observations of Magee and Milligan (1951) on the hæmoglobin of women before and after labour many of whom had low levels which could be raised by administration of iron 'But say these workers, "the great bulk of the women, whether taking iron or not were perfectly healthy and had no complaints, which raises the question whether a Hb level raised by iron therapy is in itself an advantage

It seems likely that both explanations are partly correct there may be considerable variation in the maximal level of hæmoglobin which children may attain, but dietary and perhaps other conditions may not always allow this level to be reached In the same way there is considerable variation in the maximal height which, for genetic reasons, children may attain though they may not in fact attain this height because of inadequate diet

On this view the highest levels of hæmoglobin which may be achieved with good dietaries are more than adequate for all the ordinary functions of the body and allow a wide margin of safety Levels may be appreciably lower than this without leading to any impairment in health or physique, though there must be a limit below which there will be such impairment At present it is not clear what this limit is, but it seems likely that for children it would be less than about 75% Haldane or 11 g per 100 ml. Since there is on average a gradual increase in the hæmoglobin of children as they grow (Yudkin 1944a) the level below which anæmia may be said to be present will depend on the age of the child

Though this is in conformity with the results presented in this report more evidence is needed before it can be completely accepted that a level of hæmoglobin of 75% is not mild anæmia but is within normal" limits in that it is compatible with complete physiological function

The conception that values below the possible maximum are not necessarily a sign of bodily inefficiency may be unexpected as regards hæmoglobin but is in fact accepted as regards other physiological components. It is for example accepted in this country that the daily requirement of the adult for vitamin C is no more than 30 mg (British Medical Association 1950) Yet something like three times this amount is needed before maximal levels are achieved in the tissues Just as a lower level of ascorbic acid than the maximum may still be adequate for a normal person so it may well be that a level of hæmoglobin some 10–20% below the possible maximum is similarly adequate. According to this view hæmoglobin is another example of a substance of which the body may have a physiological reserve substantially beyond its ordinary requirements

SUMMARY

A statistical analysis has been made of the results of an intensive survey on about 1200 school children to determine the factors associated with clinical pallor

The analysis shows that, compared with the child of normal colour, the pale child is more likely to be lighter, to be of a lower state of nutrition, to have a lower Tuxford index, and possibly to be shorter and to have a weaker grip

Of the many factors not associated with pallor, the most important is hæmoglobin A pale child is just as likely to have a high or low level of hæmoglobin as a child who is not pale

The level of hæmoglobin is not associated with most of the other factors studied, and the only association found was a lower level in children from larger families

In particular, levels as low as 75% of the normally accepted standards may apparently exist with no untoward effect

The significance of these findings is discussed

The survey on which this paper is based was made from the Dunn Nutritional Laboratory, Cambridge, during the tenure of a Sir Halley Stewart research fellowship My thanks are due to the Central Research Fund, University of London, for a grant towards the expenses of the statistical analysis, and to Mr L Bihaly for advice in the calculations

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ACUTE YELLOW ATROPHY OF THE LIVER FOLLOWING TREATMENT WITH PHENYLACETYL-UREA

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With a note, on the disturbance of clotting factors, by

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DURING the past three years phenylacetyl urea, a new anticonvulsive agent, has been used increasingly in America Gibbs et al. (1949) first discussed its use in 90 epileptic patients Livingstone and Kaydi (1950), recording their results in 104 cases of various types, commented favourably on its value in psychomotor attacks but mentioned the occurrence of hepatitis in 1 of their patients Carter et al (1950) allude to 2 cases of jaundice among 63 cases treated, Davidson and Lennox (1950) refer to liver dysfunction in adults, and Levy et al (1950) describe 2 cases in which a fatal hepatorenal syndrome developed after 120 g and 51 g had been taken The amounts of phenylacetyl-urea given by these authors varied from 1 5 to 5 0 g daily in divided dosage

We record here a case in which treatment with phenyl acetyl urea was followed by acute yellow atrophy

CASE-REPORT

Our patient was a girl of 15, whose attacks of minor epilepsy had begun in 1942 at the age of 7 In some of the attacks she fell and in others she was incontinent At their worst they occurred as often as 70 times daily and attendance at school had been greatly affected by them There was no family history of epilepsy or migraine, but her sister, 3 years older, had undergone hemicolectomy for Hirschsprung's disease

Between 1945 and 1947 she was treated with phenobarbitone and 'Epanutin' without any improvement In October, 1947, she was given tridione, 0 3 g t i d., and the number of attacks immediately fell to about 3 per day, but in January, 1948, she developed a rash, and, though her blood-count was normal, the tridione was stopped The fits at once returned to their former frequency and in February, 1948, the tridione was started again The next $2^1/_2$ years saw four further interruptions of the tridione treatment because of recurrence of the rash and two because of a fall in her white cell count (1400 total in October, 1949) Whenever the tridione was stopped the attacks returned to their full frequency and made it impossible for her to attend school

During September, 1950, while still on tridione 0 3 g daily, she was having 15–20 attacks daily On Sept 22, therefore, we began to use phenylacetyl urea 1 0 g t i d After the first day's treatment the attacks ceased completely On the 29th she was very well and her white cell count was 7000, with hæmoglobin 12 7 g per 100 ml On Oct 6 she was still free from attacks and felt well, but she had a slight transient rash. For this reason the dose was reduced to 0 5 g t.i.d, but on Oct 14 she had a maculopapular rash, mainly on the face, neck, and hands, and seemed rather listless The phenyl acetyl urea was discontinued On Oct 13 the hæmoglobin was 13 6 g per 100 ml., and the white cells numbered 5500 per c mm (polymorphs 76%, lymphocytes 12%, monocytes 8 5%, eosinophils 2%, and basophils 1 5%)

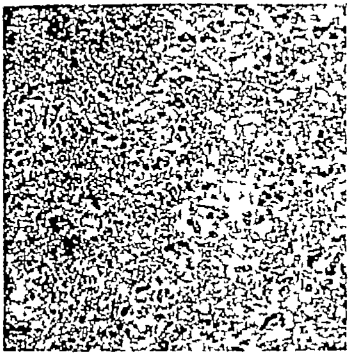
On Oct 20 the rash had disappeared but her attacks began again A week later she was having as many as 70 daily At her mother's request we started the phenylacetyl urea again in a dosage of 0 5 g t i d with phenobarbitone gr $^1/_2$ t.i.d. The attacks immediately ceased She remained well for 7 days but then became puffy about the eyes The phenyl acetyl urea was stopped but next day she became listless and sleepy and 2 days later jaundice appeared. Her condition steadily became worse, and though on Nov 12 she seemed again to improve, she relapsed into coma 2 days later On Nov 17 she was deeply jaundiced, was comatose, and had bilateral extensor plantar responses

Investigation at that time showed hæmoglobin 13 3 g per 100 ml, red cells 4,800,000 per c.mm, white cells 9200 per c mm (polymorphs 65%, lymphocytes 18%, large mononuclears 11%, eosinophils 5 5%, basophils 0·5%), platelets abundant The blood urea was 18 mg per 100 ml, the serum-alkaline phosphatase was 30 units per 100 ml (King and Armstrong), and the serum bilirubin was 24 mg per 100 ml (an immediate direct van den Bergh reaction was obtained) The serum albumin was 3 2 g, the serum globulin 2 3 g, the serum cholesterol 213 mg and the serum potassium 18 5 mg per 100 ml, and the thymol turbidity was 6 units Investigation of the clotting factors is described and discussed in the appended note by Dr Lempert From admission to hospital on Nov 16, the patient was treated with calcium gluconate, vitamins B and K, riboflavine, nicotinamide, and soluble insulin, but her condition rapidly deteriorated, and, without regaining consciousness, she died on Nov 19, 1950

Necropsy

The skin, sclera, and mucosæ were deeply jaundiced The liver (750 g) was small and showed patchy wrinkling of its capsule On section the major part was dark red, and here the lobules, though clearly outlined, appeared shrunken In both lobes there were yellow œdematous areas up to 3 cm in diameter, involving about a fifth of the total liver substance, in which the lobules appeared normal or slightly enlarged The gall bladder and main bile ducts were normal

The peritoneal sac contained about 2 litres of straw coloured fluid There was great œdema of the lower 45 cm of ileum, its wall being about 0 75 cm thick, and the mucosa showed several shallow ulcers about 5 mm in diameter The vessels of the mesentery and the portal veins were normal



hotomicrograph (× 35) of liver stained by hæmatoxylin and eosin. The lobules, in which no parenchyma cells remain are surrounded by proliferating bile-ducts

The lungs weighed 270 g and 250 g ; both contained ill efined hæmorrhagic areas up to 2 cm. in diameter The brain nd other organs did not show any significant abnormality

Histological Examination

In the areas of the *liver* which appeared dark red at ecropsy, liver parenchyma cells were extremely scanty and ere confined to the periphery of the lobules. The lobules ere clearly outlined by proliferating bile-ducts (see figure) and e sinuses were dilated with blood The reticulin framework as everywhere intact but the meshes were narrowed etween the blood *sinuses there were inflammatory cells,* redominantly polymorphonuclear leucocytes plasma-cells, d macrophages containing sudanophilic granules many of hich were also Ziehl Neelsen positive Several of the larger patic veins showed endophlebitis, with collections of lymorphs and plasma cells in the subendothelial region

The yellow areas of liver also had their lobular pattern intact, ut here there was a greater number of surviving liver cells hich were arranged periportally or in clumps at the periphery the lobules These cells showed hyperplasia with mitoses d syncytial formation. Many bile canaliculi between the rviving parenchyma cells were blocked by inspissated bile he lobules in these areas were ischæmic their sinusoids being mpressed by œdematous granular material containing many lymorphs.

In the terminal *ileum* there was massive œdema of the bmucosa, which was heavily infiltrated with polymorphs d some monocytes There were large numbers of slim am negative and large gram positive bacilli, many being tracellular The mucosa of most of the œdematous ileum as intact and here the infiltration by inflammatory cells as less conspicuous.

The hæmorrhagic areas of the *lungs* showed widespread ecrosis of alveolar walls with recent hæmorrhage into the veoli. These areas, in contrast to the rest of the lung tissue re heavily infiltrated with large gram positive bacilli like hose found in the submucosa of the terminal ileum

The *kidneys* had a few bile casts in the collecting tubules ut there was no evidence of lower nephron nephrosis Sections om several areas of *brain* did not show any abnormality

DISCUSSION

The interesting clinical features of this case include he extraordinary efficacy of the drug in preventing the etit mal attacks and its catastrophic effects on the liver The dose used was considerably less than the maximum dministered elsewhere and presumably the patient as unusually susceptible to intoxication with this drug er reactions to tridione had been abnormal.

The liver lesions were characteristic of acute yellow trophy The liver was not damaged uniformly and hereas most of it showed necrosis of all the liver cells here were areas where the necrosis was of zonal distri ution. Massive œdema of the intestinal submucosa was described by Lucké (1944) in over 30% of his series of fatal cases of epidemic hepatitis, and its occurrence in the present case, where the history is strongly in favour of a toxic hepatitis, indicates that it is not a specific feature of infective hepatitis but is a result of severe liver damage Its frequent localisation to the terminal ileum is difficult to explain by portal obstruction in the liver, or disturbance of plasma proteins In many of Lucké s cases the œdema was non inflammatory, suggesting that the bacterial invasion is secondary

INVESTIGATION OF THE CLOTTING FACTORS

(H L.)

The methods described by Israëls et al. (1951) gave the following results

Whole-blood Clotting-time.—1st tube 7 minutes; 2nd tube 11 minutes 3rd tube 14 minutes. These times are all well above the normal range

Plasma Clotting-time —Over 15 minutes (normal $1^1/_4$–$3^1/_2$ minutes)

Prothrombin-time (Quick s method): Nov 10 100 sec (less than 7% of normal activity); Nov 17 86 sec With our batches of human brain extracts used as the thromboplastin reagent in Quick s method prothrombin times of normal subjects are 12–$14^1/_2$ sec Normal oxalated plasma diluted to a 20% concentration with normal saline gives prothrombin times of 29–34 sec diluted to a 10% concentration it gives a time of 53 sec.

Plasma fibrinogen.—Since the prothrombin content of the plasma was so low, it was necessary to modify the usual method for estimating fibrinogen. Usually 1 ml of plasma, 28 ml. of normal saline and 1 ml of 2 5% calcium chloride solution are incubated at 37°C for 2 hours and the fibrin clot so formed is removed. With this patient s plasma no clot appeared even after 24 hours The modification used *was to mix 1 ml of the patient s plasma with 10 ml of* normal saline 0·5 ml. of saline extract of dried human brain and 1 ml of 0·18% calcium chloride solution With this technique a fibrin clot formed in a few minutes. This clot was removed and dissolved in alkali and the estimation of fibrinogen carried out in the usual way Result: plasma fibrinogen 251 mg per 100 ml.

It will be noted that the most striking result from these laboratory tests was the extremely low level of prothrombin activity The serum proteins and plasma fibrinogen were not reduced to anything like the same degree The patient was deeply jaundiced, and whether the prothrombin activity was reduced before the jaundice appeared is a matter for conjecture On this evidence, however it seems advisable to investigate prothrombin activity when patients are being treated with phenylacetyl urea

We would like to record our appreciation of the kindness of Dr F R Ferguson and Prof A. C P Campbell in allowing us to report this case and for their helpful advice

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Hospital medicine which constitutes the basis for undergraduate medical training is essentially technical in nature with an emphasis placed on the physical rather than on the social pathology of the illness. The clinics *resolve themselves into an examination of parts but not an* examination of the person The fact that the patient may be worried about his work and family is of little concern in clinical instruction, which finds its emphasis dictated by the requirements of the final examination and not by the subsequent needs of the practitioner in human relationships This detachment of the patient from the security of his own social environment by the scientific efficiency of men and machines brings forth patient attitudes of self pity aggressiveness or passive indifference —SYDNEY D RUBBO and PATRICIA GLADWELL, *Med J Aust* Jan. 10 1952 p 71

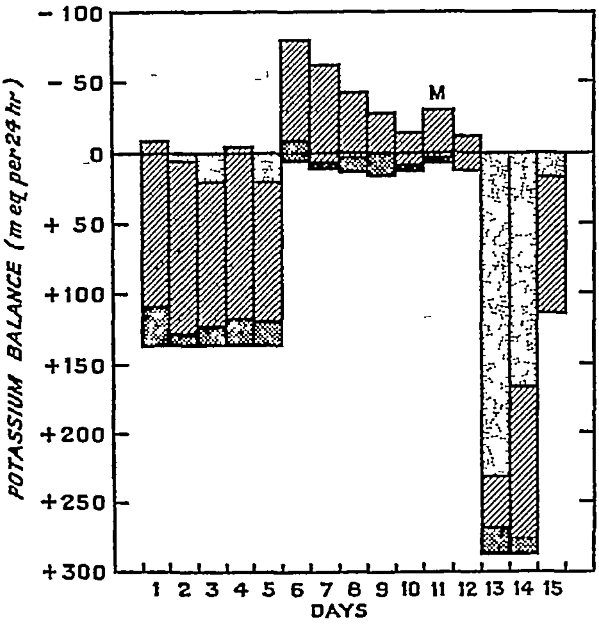
Preliminary Communication

EXPERIMENTAL POTASSIUM DEPLETION IN MAN

DEPLETION of body potassium has been demonstrated in a number of syndromes, including diabetic coma, and in severe vomiting or diarrhœa Potassium depletion is often attended by muscular weakness, which responds to treatment with potassium salts, but weakness seems to be related mainly to depletion of the small proportion of body potassium which is in extracellular fluid The greater part of the potassium lost from the body must, however, have come from inside the cells, and it is scarcely possible from an analysis of the clinical syndromes to discover what effects, if any, may arise from a deficit of intracellular potassium There is no simple analysis which measures this deficit, and the clinical syndromes are always complicated by changes in other electrolytes, and in body hydration For this reason, we have sought to produce in normal subjects a state of potassium depletion uncomplicated by primary deficit of other electrolytes or of water In this communication we aim at a summary of the results obtained, reserving till later their detailed presentation, and discussion of the possible mechanisms involved.

TABLE I—CATION COMPOSITION, IN M.EQ PER LITRE, OF UNTREATED MILK (AVERAGE OF 14 DAYS), AND MILK TREATED WITH RESIN (13 DAYS)

—	Untreated	Treated
Sodium	36	111
Potassium	43	3
Calcium	56	27
Magnesium	21	8
Total	156	149



Day-to-day potassium balance in subject I The intake, in m eq per day, is plotted downwards from the base-line, and the output in stools (solid columns) and urine (hatched columns) is plotted upwards from the intake level A positive balance is shown by stippled columns below the base-line and a negative balance by columns which extend above the base-line The cumulative negative potassium balance in the resin period is 268 m eq and the cumulative positive balance in the after period is 415 m.eq On the day marked M, an osmotic diuresis was induced with mannitol

METHODS

We used a fluid diet of 3 litres of milk daily, with 125 g glucose added In the depletion period, this was run through a long column containing 500 g of 'Zeo-Karb 225 Na,' a cation exchange resin previously charged with sodium This removed almost all the potassium from the milk, and part of the calcium and magnesium, these cations being replaced by sodium from the resin Table I shows the cation composition of milk with and without resin treatment, it is derived from 14 samples of untreated milk and 13 samples which had been passed through resin In the preliminary and after periods, the milk was fortified with sodium salts, so that the daily intake of sodium was approximately the same throughout In the first experiment sodium chloride was used, in the second a mixture of chloride and bicarbonate in the proportions found in extracellular fluid Milk, urine, and stools were analysed for electrolytes and nitrogen by standard methods Experiments were done on two normal adult males, the times being

	Experiment 1	*Experiment 2*
Preliminary period	5 days	3 days
Resin period	7 ,,	6 ,,
After period	3 ,,	3 ,,

In the after period, 10 g of potassium salts was given daily in one dose, chloride in experiment 1, and a "biologically neutral" mixture of chloride and bicarbonate in experiment 2

TABLE II—ESTIMATE OF TOTAL BODY-FLUID, AND ITS DISTRIBUTION BETWEEN COMPARTMENTS (SUBJECT I)

Stage of experiment	Date	Extra-cellular fluid	Intra cellular fluid	Total
Initial (assumed values)	Oct 14	14 1	42 9	57 0
End of preliminary period	,, 19	14 7	42 4	57 1
Middle of resin period	,, 23	15 5	41 7	57 2
End of resin period	,, 26	17 1	39 8	56 9
End of after period	,, 29	15 0	40 6	55 6

Changes in total body fluid calculated from change in body weight and from stool weight and urine volume Changes in extracellular fluid calculated from the chloride balance Intracellular fluid estimated by difference

RESULTS

Cumulative potassium deficits of 268 and 289 m eq were attained in the two experiments, these amounts represent about 5% of the body potassium, and are comparable to the deficits which have been recorded after diabetic coma Serum-potassium levels fell to 3 1 and 3 2 m eq per litre and to 2 6 m eq per litre in subject 1 after glucose ingestion The greater part of the potassium deficit was acquired in the first few days of dietary depletion, because renal conservation of potassium became increasingly effective The accompanying figure shows this, and also that the retention of potassium in the after period, under conditions of potassium loading, was much greater than the previous deficit This happened in both experiments, and is a matter of some consequence because retention of potassium under similar conditions has been freely used as a measure of previously existing potassium depletion in clinical metabolic studies.

With this degree of potassium depletion there were no dramatic general effects There was no muscular weakness either subjectively or by dynamometer, and ordinary laboratory work was carried on without obvious disability There may have been some loss of capacity for sustained effort, and some general apathy, but the effects of a monotonous diet and the consciousness of self experiment can hardly be discounted There was no change in ballistocardiogram tracings and the only definite alteration in the electrocardiogram was the appearance of U waves

In contrast to the lack of clear-cut clinical symptoms, the period of potassium depletion induced very definite changes in the amount and composition of body fluid The amount of potassium lost would correspond to about 3 5 litres of intracellular fluid ; yet there was no significant *loss of weight in either subject during the period of* depletion. There was, however, considerable retention of sodium and chloride, suggesting that the fluid lost from the cells was expanding the extracellular fluid in conformity with this the hæmatocrit value fell by about 10% in both subjects. In subject 1 change in total body fluid was calculated from the change in body weight, and change in extracellular fluid volume from the cumulative chloride balance intracellular fluid volume was obtained by difference The results are shown in table II The change in intracellular fluid in consequence of potassium depletion seems to have been one of volume rather than of composition. No tissue analyses were done but there was no fall in the concentration of potassium in the red blood-cells. Balance results showed a considerable loss of potassium from cells but no definite entry of sodium into the cells. There was a negative balance of phosphorus in amount equivalent to that of potassium

The most striking change in the composition of extracellular fluid was the appearance in both subjects of a metabolic *alkalosis. This has often been recorded in* clinical states of potassium deficiency It was not predominantly due to a primary renal mechanism, as the urine became more alkaline during the resin period In subject 2 the partial pressure of CO_2 in the alveolar air did not change excluding a respiratory acidosis. The *alkalosis* responded temporarily to ammonium chloride in subject 2, and in both subjects it disappeared on potassium loading even in subject 2 where the loading was done with bicarbonate as well as chloride

CONCLUSION

We have produced a state of potassium depletion which as judged by serum levels and subsequent retention of potassium is comparable to that described after diabetic ketosis or after surgical operations There were no serious clinical symptoms and we doubt whether potassium depletion of this degree can account for some of the symptoms which have been ascribed to it In our view moderate degrees of potassium depletion should be controlled by oral potassium and intravenous potassium therapy with its risk of cardiac arrest, should be reserved for patients with very low serum potassium levels and associated muscular palsy who cannot take potassium by mouth

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Reviews of Books

Blood Transfusion in Clinical Medicine

P L. MOLLISON M.D M R.C.P director Medical Research Council blood transfusion unit. Oxford: Blackwell Scientific Publications 1951 Pp 456 37*s* 6*d*.

THE last few years have seen the publication of quite a number of books on blood transfusion, blood-groups and related subjects such as hæmolytic disease of the newborn. Some have been addressed to the specialist others have covered the whole field of blood transfusion, and all of these have followed much the same pattern Dr Mollison who has made outstanding contributions both to the theory and the practice of blood transfusion, has now added one more to the books on this subject. But he has used a fresh approach and drawn freely on his extensive personal experience in the laboratory and in the ward and the result is a refreshingly original work which can be highly recommended It has been written for those who have to give transfusions, and already possess an elementary knowledge of blood transfusion As Dr Mollison says a proper understanding of the clinical uses and effects of blood transfusion requires a competent knowledge firstly of the antigenic structure of the red cells, secondly of the regulation of blood volume and the effects of transfusion on the circulation and thirdly of the survival of the various elements of the blood after transfusion He treats these three subjects concisely and clearly particularly we may mention the sections on blood-groups and blood-grouping technique which put in perspective the clinical significance of the various blood-group systems and give an authoritative account of the necessary scope of blood-group and compatibility testing needed for safe transfusion There are chapters on transfusion in relation to hæmorrhage and anæmia on the use of transfusion as a method of investigating the survival of normal and pathological cells under a variety of conditions, and on the harmful effects of transfusion A detailed account of hæmolytic disease of the newborn, largely based upon Dr Mollison s own experience completes a book which is both informative and stimulating

Health and the Citizen

JOSEPH V WALKER, M D M.R.C P., D.P.H. London: Hollis & Carter 1951 Pp 151 10*s* 6*d*.

Dr Walker describes his book as a study in design for living and intends it as a contribution to a philosophical approach to the subject. He states that the fields of enquiry relevant to health are work home play and worship ; and he wishes with especial emphasis to bring the spiritual coördinates of Health into the picture Dr Walker has a long experience of public health work but he refers almost entirely to public health in this country and leaves out those ranges of public-health activity in the tropics of Africa, and in India China, and the Far East generally, which have in recent years *so vastly enlarged the horizon. The work of* W.H O , which has already begun to have a revolutionary effect in changing the conditions of life of many millions of depressed people is not considered Nor in discussing spiritual values does he refer to Buddhism or to such spiritual values as those of Mahatma Gandhi s influence in India. The philosophical approach to this subject should surely be wider and include all the major religious beliefs.

Dr Walker has no high opinion of the work of the general practitioner, whom he describes as too busy with the details of his day to-day work, and rarely able to extend his studies to a wider field The medical officer of health on the other hand, he regards as the interpreter of public policy This estimate of the general practitioner is neither fair nor accurate some no doubt—and even some medical officers of health perhaps—have a limited and utilitarian attitude to their work but the Hippocratic Oath has not lost its influence

This book is sincere but the field of inquiry surveyed seems hardly large enough for the building of a universal philosophy

The Neuroses

Diagnosis and Management of Functional Disorders and Minor Psychoses WALTER C ALVAREZ, M.D., professor of medicine emeritus, Mayo Foundation, University of Minnesota Philadelphia and London: W B Saunders 1951 Pp 667 50*s*

IT is often urged that what medical students need to know about neuroses should be taught them by physicians or better still by wise general practitioners who are likely to avoid the involved language the theorising and the blinkered approach which psychiatrists are said to exhibit This book gives a good indication of what such teaching would be like Dr Alvarez has been associated for many years with the Mayo Clinic he is a sensible and kindly man, with a gift for putting his experience into familiar language every reminder and every warning is illustrated by snippets of clinical recollection Though to the psychiatrist the book seems for the most part uncritical, it is strong at those points where the psychiatrist is weak By the accumulation of familiar and telling instances, some simple truths—that people's feelings cannot be ignored by doctors, that the strains of daily life cause illness, that neuroses can be relieved by doctors who do not delve into the unconscious or understand its mysteries—are driven home so that even the practitioners trained in a philistine medical school will heed and apply them. Alongside the guides to reasonable action in which the book abounds, there is an explicit indictment of certain aspects of American medical practice which makes plain the need for a less mechanical outlook than now prevails in it, and perhaps a less overtly commercial basis for individual medical care. These things, as Dr Alvarez shows, have their impact on the detection and treatment of neurotic illness.

Surgical Care

ROBERT ELMAN, M.D., F.A.C.S., professor of clinical surgery, Washington University. New York: Appleton Century Crofts. 1951. Pp. 586. $8.

Surgery of the Stomach and Duodenum

CLAUDE E. WELCH, M.D., associate visiting surgeon, Massachusetts General Hospital. Chicago: Year Book Publishers. London: Interscience Publishers. 1951. Pp. 349. 65s.

THE changed outlook of surgeons in recent years is very noticeable on comparing these two books. Formerly all emphasis would have been centred on Claude Welch's description of technical operative procedures; now more and more attention is given to such considerations as appear in Robert Elman's *Surgical Care*. He calls it in fact, a "practical physiologic guide"—which indeed it is, and a very good one. The subjects treated are those functions and physiological circumstances which can be influenced or have any bearing on the progress of the patient after operation. Nutrition, salt and water balance, and the significance for safety of adequate protein stores are all burning questions when a critical operation is in prospect. In their light, preoperative treatment is discussed. But all subjects connected with operations—anæsthesia, chemotherapy, shock, abdominal and thoracic complications, and psychiatric matters—find a place in this excellent book, which could usefully be read by every house-surgeon and junior surgeon.

Welch, in his work, which is one of a series of six handbooks of operative surgery, describes the technique of nearly every operation on the stomach which has been devised, good or bad, and this review is well up to date. The clear and explanatory illustrations are all line drawings. It would have been more useful if the relative merits of the numerous procedures described had been maturely assessed. An inexperienced surgeon consulting this book would find it hard to choose among the many operations given equal prominence. On the other hand he would find out what to do if any complication arose, how to feed his patients, and how to treat them in the postoperative period, and the very extensive bibliography would help him to track down original sources. A very useful book.

Verletzungen der Lungen und des Brustkorbes

WALTER STEFFENS, ehemals Chefarzt der Versorgungs ärztlichen Untersuchungsstelle, Berlin. Stuttgart: Thieme. 1951. Pp. 320. D.M. 10.90.

THERE were obvious improvements in the treatment of chest wounds in the late war as compared with the 1914–18 war, but it is of interest to know more about the late results of these injuries, particularly where complicated. In his analysis of the complications and fate of patients wounded in the earlier war, Dr Steffens notes the high rate of pleural infection and untreated hæmothorax, and he gives many examples of Panzer pleura with its cuirasse of bone and calcified pleural layers. Foreign bodies that were retained for any length of time prepared the road to infection and were radiologically enclosed in ring shadows which represented abscess cavities—a source of infection and hæmorrhage. The average age of the patients who died after the war was in the middle forties. Tuberculosis as a cause of death was common, and the high incidence of this disease following chest wounds seems well out of proportion to the risk that the wounded man would be exposed to in ordinary life.

This detailed monograph is a valuable reference of complications and end-results. It is also a reminder of what may happen if chest injuries are not treated properly in the first instance.

Oral and Dental Diseases (2nd ed. Edinburgh: E. & S. Livingstone. 1951. Pp. 1012. £5).—Prof. H. H. Stones's comprehensive survey of the ætiology, histopathology, clinical features, and treatment of oral and dental disease was well received when it first appeared, three years ago. His second edition deserves an equally warm welcome. He set himself the difficult task of combining in a single volume a textbook for students and a reference book for dental and medical practitioners, and he has been highly successful. The student will find descriptions of the wide variety of pathological conditions with which he must be acquainted, but the main emphasis rests on diseases which have to be diagnosed and treated regularly by medical or dental practitioners. In striking this balance Professor Stones has drawn upon his experience as a teacher, examiner, and consultant. A useful section dealing with the ætiology, bacteriology, and histopathology of dental caries shows clearly how incomplete is our understanding of the pathology of this disease. Long chapters are devoted to acute infections, chronic oral sepsis, tumours, and stomatitis and its allied diseases. Professor Stones is widely read, and his bibliographies will be valuable. The illustrations, particularly the colour plates, are very well produced.

British Red Cross Society *Welfare Services Manual no. 12* (London: Cassell. 1951. Pp. 209. 4s. 6d.).—Edited by R. G. Gilmour, A.M.I.A., this is a guide to the social services, both statutory and voluntary, written for British Red Cross Society workers, but equally valuable for all social workers. Legislation of recent years has so multiplied the benefits provided by the State that many believed that the work of the voluntary societies was no longer necessary; that this was an error is now generally realised, for the main functions of the voluntary bodies remain as they were except that they are relieved of financing the actual amenities, which the State supplies. These functions are threefold: to help those in distress to obtain the relief to which they are entitled by law; to fill in the gaps and delays which necessarily occur between the need and the obtaining of relief; and the search for, and palliation of, distresses which are not otherwise provided for. All social legislation started from voluntary effort, and such effort will always be needed to translate the impersonal provisions of the State into terms of human relationships. This little manual serves the threefold purpose for which it was produced: (1) as a textbook for students taking the welfare services course; (2) to help the workers in their subsequent action; and (3) to give material for lecturers in the course.

Fortschritte der Allergielehre (Basle: Karger. 1951. Pp. 572. Sw. fr. 68.65).—In this, the third volume in the series "Progress in Allergy," which appears three years after the second, the editor, Dr Paul Kallos, has allowed contributing authors to put forward their opinions without much regard to overlapping or disagreement. Thus Dr David Harley, discussing the infective factor in asthma and rhinitis, says that "allergy is a branch of immunology and immunology is a section of bacteriology, yet many practising allergists would seem to be without training in immunology or bacteriology"; while Dr A. H. Rowe, who has always emphasised the importance of food allergy, finds infection a "rare secondary or major cause of bronchial asthma." The more general articles on asthma by Dr Leon Unger and on allergy in children by Dr M. Murray Peshkin are good general reviews with no very strong bias. Cardiovascular allergy is reviewed by Dr Joseph Harkavy, drug allergy by Dr E. A. Brown. Prof. A. Stoll's article on the chemical investigations of ergot alkaloids is excellent, though possibly out of place in a book of this nature. The article by Dr E. Rothlin and Dr R. Bircher as well as the general introduction by Dr P. Kallos, contain good reviews of current allergic problems. Dr J. F. Ackroyd in his contribution on 'Sedormid' purpura as an example of drug hypersensitivity takes the reader step by step through his researches; and here it seems real progress in the study of allergy has been made.

Only brief mention is made of adrenocorticotropic hormone and the way in which it affects fundamental problems in allergy.

THE LANCET

LONDON SATURDAY, FEBRUARY 2, 1952

Needs and Means

On another page we summarise those of Mr BUTLER's proposals that directly affect the social services. It has long been obvious that these services are facing an economic crisis, and in considering the Chancellor's immediate remedies it may be useful to review the background as lately sketched by two Conservative members of Parliament, Mr IAIN MACLEOD and Mr ENOCH POWELL.[1]

The fall in the value of money since 1948, the costs of rearmament, and the fact that Britain has now nearly $1^1/_2$ million more people of pensionable age than in 1930 leads these writers to question whether we can now afford to sustain the "free service" principle These unwelcome developments are also leading to a situation in which more and more people in receipt of insurance benefits are being forced on to National Assistance because the scales of contributory benefits are inadequate to meet today's living costs National Assistance in the Beveridge and Coalition Government conception (and indeed in the Socialist 1945–48 legislation) was designed as protection for the small minority which even the most elaborate schemes of insurance must leave uncovered. The drift from the insurance principle to the method of assistance is, say Mr MACLEOD and Mr POWELL, 'eating its way now into all the social services ' Thus two of the great solvents which have transformed the social services since the days of the destitution test of the workhouse are now being threatened. One solvent was the principle of insurance, substituting a contractual right to services for the test of means The second, affecting chiefly the health and education services was the principle of "free service' superseding the test of means or the insurance qualification

Mr MACLEOD and Mr POWELL suggest two possible ways of finding more money for the social services and of restoring the sovereignty of the insurance principle and the first is that insurance contributions should be substantially increased There are however objections in principle to this proposal which they do not examine Because contributions are collected on the flat-rate principle their proposal would reinforce the present retrogressive effects of the insurance scheme. People on low wages and salaries would be paying an even larger proportion of their income in insurance contributions than they do now, and the disparities in the *incidence of this poll tax as* between different income groups would widen Moreover, as the contributory system takes no account of dependants, it follows that those with family responsibilities would suffer most A further point which Mr MACLEOD and Mr POWELL seem to overlook is that the rising costs of the income maintenance services are dominated by the needs of old-age pensioners To transfer more of this national burden of old age (for that is what it has indeed become) to the backs of people with small incomes including those with families to support, does not seem to us to be either wise or equitable

Their second method of gathering in more money for the social services is even more controversial It arises from the fundamental assumption which Mr MACLEOD and Mr POWELL adopt, that as redistribution of resources is a characteristic of the social services, assistance to individuals should be rendered only on evidence of need—i e of financial inability to provide each particular service out of one's own or one's family's resources The question therefore which poses itself to them is not ' Should a means test be applied to a social service ? " but Why should any social service be provided without test of need ? ' Apart from the general food subsidies, which were not designed or introduced as a social service and can hardly be classed as such today, the two most expensive services which are relatively free of tests of means are education and health Before this question is addressed to these services it is worth asking why it was considered necessary to exempt them from a test of means One important reason which these writers adduce for the freeing of education has been the view that education is less a personal benefit than a national necessity—' the nineteenth century Prussian view that it was to the State's advantage to secure to its citizens the education which would make them more efficient in peace and war ' The idea of a community purpose in education stretches back through the Middle Ages into antiquity and largely lies behind the private and public benefactions and foundations to provide free education ' The more nearly conclude Mr MACLEOD and Mr POWELL, a service approaches to a public and general benefit and recedes from a personal one, the more natural is its provision without charge or test of means ' This seems to fit quite neatly the modern concept of medicine as a social service Indeed, the idea of health as a public benefit has been growing steadily wider during the past half century, ever since the free admission to poor law hospitals of smallpox and fever patients became the rule in 1875, and a universal free health service for the treatment of venereal disease was instituted in 1917 Developments in the fields of maternity and child welfare, school medicine and industrial health and tuberculosis services further extended the provision of services without charge or test of means This historical process in the province of medical care and treatment virtually attained legislative completion in 1948 The public health as a whole—and not just some isolated sectors of it—became a national responsibility The prevention as well as the treatment of sickness became a national necessity To retreat from this position now would be lamentable Moreover any wide extension of charges and tests of means would lead, quite literally, to an immense series of administrative complications and entanglements for sick people Many classes of patients and categories of disease would have to be excepted from charges and means tests—expectant mothers, the tuberculous, some industrial injuries and diseases, some of the mentally ill and defective, war and Civil Defence pensioners, and so forth Then again, should these exceptions be applied only for hospital care and not for services rendered by both the general practitioner and local-authority clinic ? Administratively, it is by no means easy to impose personal charges for the use of different parts or only some parts of the health services

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[1] The Social Services: Needs and Means. 1s London Conservative Political Centre

A second fundamental objection to such a policy is one that Mr MACLEOD and Mr POWELL do not examine in their pamphlet The financial effects of any substantial extension of charges and tests of means for the use of the health services would fall heavily on the middle classes Already people in this group are conscious of severe taxation and of the compulsory insurance contributions they make Why should they pay again ?—for that is how they would view the additional charges Moreover, as with the inequitable incidence of insurance contributions, the burden would fall with special weight on those with family responsibilities The larger the family the greater the likelihood of need for medical care Yet, unless these charges are to be graduated according to income and adjusted to take account of responsibilities (which in practice would mean creating miniature and overlapping tax systems) justice would not be done

A priori, it would seem that an attempt to finance the health services in part through taxation, in part from insurance contributions, in part from local rates, and in greater part by the imposition of a variety of individual charges must lead to muddle, anomaly, and hardship Carried to any considerable length, it would make nonsense of the principle enshrined in national taxation that those who pay according to means and responsibilities are not denied the use of a universal service if and when they wish to avail themselves of it Taxation may be an imperfect instrument, but it is still the best we have Happily the changes so far announced by Mr BUTLER are not so great as to make any radical change in the system by which the social services are financed The charge of a shilling for each prescription is not much more than a token charge, and is probably worth trial on its merits as a means of discouraging excessive demands for medicines A higher tariff for amenity beds is not unreasonable, there is a case for asking patients to share in the cost of appliances, and it has long been felt that too large a proportion of our limited resources are going into the dental treatment of adults The danger is rather that these things may represent the thin end of a very thick wedge

Surgery of the Adrenal Cortex

A GREAT deal of new knowledge about the adrenal gland has been gathered in the last 30 years, by the combined efforts of surgeons, physicians, physiologists, chemists, technicians, and many others besides specialists in endocrinology

In the Moynihan lecture that opens the present issue, Prof WALTMAN WALTERS, the distinguished surgeon of the Mayo Clinic, who has seen the gaps filled one by one, summarises the functions of the adrenal cortex, giving details of the 5 main steroids of the 27 isolated from it deoxycortone, and compounds A, B, E, and F The identification of these adrenocortical steroids—closely related chemically to cholesterol, the bile acids, and cardiac glycosides—together with their physiological actions, and the development of methods for estimating their activities from the hormone metabolites in the urine, have enabled surgeons to diagnose adrenocortical dysfunction, and differentiate between its likely causes with fair certainty, before embarking on an operation Then, besides linking the symptoms and signs with the pathological lesions found in the gland, this laborious chemical classification has aided in the assessment of operative results Lastly, the production of natural steroids and of synthetic cortisone (compound E) in large though still too meagre quantities has brought within the scope of adrenal surgery the cases of Cushing's syndrome without any hyperfunctioning tumour, and by reducing the risk of cortical insufficiency has greatly reduced the mortality of adrenalectomy

An observation that had far-reaching effects is recalled by WALTERS, from his case notes of 1924, in a case of adrenal carcinoma which was operated on but ended fatally from adrenocortical insufficiency Its importance lies in the atrophy noted in the "healthy" gland, for experience has shown WALTERS that this is a typical and consistent feature of cases of adrenal functioning tumour—the gland on the other side atrophies, usually enough to be recognised naked-eye by an experienced surgeon, by its being abnormally pale, thin, and small The symptoms and signs of Cushing's syndrome vary widely, and an identical clinical picture can be produced by a functioning cortical tumour or by general cortical hyperfunction. The treatment of the two conditions is not the same—with a tumour the opposite gland is left intact, whereas for hyperplasia WALTERS does a bilateral subtotal adrenalectomy—so the first step in the operative treatment is to determine which is present Until lately WALTERS and his colleagues explored both glands before resecting either, but they now base their procedure on the appearance of the first gland exposed if it is atrophic, the opposite gland is inspected, with a good chance of finding a tumour there, but if the first gland looks normal, 90% is resected without looking at the other About a fortnight later, in patients with general hyperplasia, a total adrenalectomy is done on the opposite side, this exceptionally experienced team can safely dispense with preliminary exposure of the remnant of the first gland to make sure it is viable The ordinary mortal surgeon (and even one at the Mayo Clinic if he feels in doubt) may prefer to decide whether a gland is atrophic with the help of a pathologist's immediate report on a frozen section When there are unmistakable clinical and biochemical evidence of Cushing's syndrome, the Mayo Clinic surgeons do a 90% resection on one side and a total adrenalectomy on the other, even if both glands look grossly normal. In adults the removal of benign tumours is usually successful and almost free from risk—in the Mayo Clinic's last 30 cases the mortality is nil When Cushing's syndrome arises at or before puberty the outlook is less promising For postpubertal virilism

BROSTER,[1] of Charing Cross Hospital, our most experienced adrenal surgeon, has done 125 unilateral adrenalectomies with no operative mortality, of 88 patients followed up by 1945, in 16 the result was good, 46 were improved, 10 were in statu quo, 3 had died from other causes, and 14 were untraced

The most important factor in the surgical treatment of Cushing's syndrome, in WALTERS's view, is the anticipation, prevention, and control of postoperative adrenal insufficiency, it is adrenal failure that accounts for the high mortality in some series For the whole postoperative period the patient must be watched for the following clinical signs of incipient adrenal failure, which may precede significant changes in the blood-chemistry anorexia hiccup, nausea vomiting, weakness, insomnia, apathy or restlessness a rising pulse-rate, and a fall in blood pressure Fatal adrenal failure can develop in a few hours and WALTERS warns the surgeon against the false sense of security that leads him to relax his precautions Apart from close observation, the preventive measures consist of preoperative and postoperative doses of cortisone, large amounts of sodium chloride and citrate both by injection and by mouth, and a low potassium diet

At the University of Chicago, where the first successful total adrenalectomy in man for metastatic cancer of the prostate was performed in 1945, HUGGINS and BERGENSTAL[2] quote reports of total adrenalectomies for hypertension, with great symptomatic relief in 4 patients out of 12 They also report 2 cases where this operation was done for relapse after orchidectomy and œstrogen treatment of prostatic cancer Adrenalectomy and maintenance cortisone therapy immediately relieved both men's pain and both gained over 25 lb in weight and returned to work in the six months before the report was written Nevertheless, the Chicago writers end on a note of caution Before a total or very extensive adrenalectomy is done they say the doctor is faced with this grave decision—'Do the chances of therapeutic reward counterbalance the certainty of long continued hormonal replacement therapy and the constant danger of the development of Addison's disease?' Adrenal surgery, as HUGGINS and BERGENSTAL urge is not to be embarked on lightly

The Handicap of Epilepsy

ANY general practitioner with a list of two thousand patients is likely to have four or five epileptics under his care These patients, as he knows well, are far less distressed by the fits than by the social handicap they represent It is hard for the public to dissociate the ideas of epilepsy and mental disorder—not unnaturally, since epilepsy is fairly common among mental defectives But most epileptics living outside institutions are normal people apart from their fits and since the fits mean nothing in particular to them they cannot see why others should find them so disturbing For the epileptic, his disorder consists in short periodic spells of unconsciousness inconvenient rather than unpleasant, from which he usually recovers quickly The recurrent pangs of a gastric ulcer the incapacitating headaches of migraine the crippling results of rheumatism or the discomforts of asthma seem to him far worse handicaps Such disorders, however, carry no social stigma, largely because they do not alarm or disconcert others in the way a fit is likely to do

Parents are often ashamed that a child of theirs should have fits and the child does not take long to know it If he has fits at school the other children are frightened and shun him. He gets a strong sense of failure and isolation, shares the shame and anxiety of his parents and because he is friendless becomes unfriendly Moreover because he is anxious and unhappy his fits increase In his interests his parents must learn to hide their fears, and to persuade his teachers—who in turn must persuade his schoolfellows—to take the fits as a matter of course demanding no special attention If his intelligence is normal he will benefit by normal education, normal human relations and a normal home life, and he will respond to such ordinary treatment by developing normally On the other hand if he is a source of anxiety to his parents and an unpopular butt at school, he is likely to develop temperamental difficulties These are so common among epileptics that they are often accepted, even by doctors, as symptoms of the disorder yet they are nearly always an artefact the result of the emotional and social frustrations the patient has been called upon to bear

The British Epilepsy Association founded last year as a memorial to the work of Dr TYLOR FOX is concerned to educate the public in the nature and social effects of epilepsy and to help epileptics to take their proper place in the community During the war epileptics, like other disabled people were trained for essential work, how much service they are capable of giving is shown by the fact that, of the 15,078 epileptics on the Disabled Persons' Register in April 1950, no fewer than 13,563 were actually in work Work is good for all of us, but it is specially good for epileptics because occupation and interest are direct anticonvulsants the electro-encephalograph shows that the petit-mal type of cerebral dysrhythmia is inhibited by mental alertness and the tendency of epileptics to have more fits during periods of stress and anxiety is well known

The general practitioner can do much to give epileptics and their families a balanced view of this disorder His success in allaying the anxiety of parents will be reflected in the lessened tension of epileptic children His first task is to combat the widely held notion that the outlook is necessarily bad The fact is that many people who have fits in childhood and adolescence become free of them in later life He must of course, exclude an organic lesion as a cause of the fits, and this can be done by electro-encephalography In cases where fits have started in adult life, naturally such an investigation is particularly important In idiopathic epilepsy modern anticonvulsant drugs usually control the fits completely or—if the doses are properly timed—confine them to the night or early morning When epilepsy runs in the family nothing is gained by trying to hide from the child that he has fits He had much better start learning at once how to manage his disability If his fits are very numerous or his home conditions bad, the school doctor will arrange for his admission to a special school for epileptics In adult life the epileptic's capacity for work must be assessed in terms not only of the number and severity of his fits but also of his aptitudes, intelligence, and temperament In placing him, the disablement resettlement officer is guided by the report he receives from the family doctor when the patient registers as a disabled person The British Epilepsy Association, membership of which is open to all interested in epilepsy, will furnish information on all subjects to do with epilepsy and epileptics The office of the association is at 7, Victoria Street, London, S W 1

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[1] Broster, L. R. *Proc. R. Soc. Med.* 1940 40 35.
[2] Huggins, C., Bergenstal, D. M. *J. Amer. med. Ass.* 1951 147 101

Annotations

VAGUS-PHRENIC ANASTOMOSIS

Brown and Satinsky[1] have described an intriguing piece of experimental surgery which may point the way to more effective treatment for permanent paralysis of the diaphragm due to anterior poliomyelitis or other cause They have shown conclusively that in the dog anastomosis between the central end of the vagus and the distal end of the phrenic nerve is practicable and restores diaphragmatic movement

Bilateral section of the phrenic nerve quickly results in the animal's death, while unilateral phrenic section appears to cause little disturbance In six dogs the vagus was divided about $^{1}/_{2}$ in below its recurrent laryngeal branch, and the phrenic nerve was divided about 2 in above the diaphragm, and the ends of the two divided nerves were sutured The proximal end of the phrenic was ligated, doubled back on itself, and again ligated to prevent regeneration After operation the diaphragms were screened radiologically and the movements on the operated side compared with those on the normal side In all six animals diaphragmatic movement returned on the side previously paralysed by section of the phrenic nerve, the interval before function returned varied from 15 days to 138 days In four animals, after regeneration the opposite phrenic nerve was divided, and these animals survived, thus ruling out the unlikely possibility that the paralysed side of the diaphragm had been re innervated by fibres crossing over from the normal phrenic nerve In two animals, after vagal-phrenic regeneration had taken place the normal phrenic nerve was sectioned, and four months later the site of suture was excised, in each case the dog died within ten minutes These experiments show conclusively that the paralysed side of the diaphragm had been re innervated after the nerve anastomosis Histological studies of the suture site also revealed that the regenerating fibres of the vagus had grown down into the distal stump of the divided phrenic nerve

This seems to be the first experimental demonstration *that parasympathetic preganglionic fibres of the vagus* can regenerate into a voluntary motor nerve and make functional connection with skeletal muscle If the same successful vagal phrenic anastomosis can be performed in man it may be possible to restore diaphragmatic movement in patients with permanent paralysis following poliomyelitis The timing of the operation is clearly going to be difficult Performed too soon after the acute attack it might interrupt spontaneous recovery of diaphragm movement, while if it were delayed too long the muscle fibres of the diaphragm might have degenerated so that little muscle remained to innervate Keeping the muscle fibres of the diaphragm in a state of reasonable nutrition by means of galvanic stimulation—so important a procedure in peripheral nerve injuries *during regeneration—offers considerable difficulties.* The next step is perhaps to find out how long the diaphragm can remain denervated and yet still regain normal function after anastomosis of the vagus and phrenic nerves

DISINFECTION OF THE SKIN

It is of the first importance that the hands of the surgeon and the skin of the patient should be disinfected by the best possible method The work of Price,[1] Colebrook,[2] and others showed that the bacterial population of the skin consists of "transients" on the surface and in the skin folds, and of "residents" mainly in the crevices and deeper layers The "transients," which may include pathogenic as well as saprophytic organisms, are fairly easily removed by washing, but the "residents," mostly non-pathogenic but possibly including *Staphylococcus pyogenes*, are more difficult to destroy and may be carried by sweat into the interior of the surgeon's gloves and infect the wound if the glove is punctured An antiseptic satisfactory for single application to the skin of the patient is of course unlikely to be suitable for *repeated application to the surgeon's hands* Gardner[3] studied a wide range of antiseptics, measuring the ability of a single application to achieve virtual disinfection of a standard area of skin on which a suspension of *Staph albus* (or certain other organisms, including *Pseudomonas pyocyanea*) had been swabbed and allowed to dry The only solution that did this regularly in 15–20 seconds was 2% iodine in 70% alcohol All the other substances tested, including 'Chloros,' 'Dettol,' ether, cetrimide, and mercurials, were slower or imperfect in their action, the only solutions that nearly equalled iodine in alcohol were 10% cetrimide or 30% 'Zephiran' in alcohol, these are slower but could be used in case of hypersensitivity to iodine Iodine in alcohol is thus very suitable for needle-puncture or as a single application before operation, and, unless the skin seems unhealthy, no elaborate washing or other preparation is desirable. Seddon, who collaborated with Gardner in the inquiry, used this method for two years in orthopædic practice; he observed no infection attributable to infected skin and had only an occasional mild case of dermatitis Lately, however, Murphy et al[4] have reported that tincture of 'Acrizane' (9 parahexyl oxyphenol 9 chloro 10 methyl acridine) 1 200 is even more effective

The surgeon's hands present different problems, one of the most serious being the risk of dermatitis from scrubbing and strong antiseptics To avoid this risk many surgeons in America are using a diphenolic compound with six chlorine ions known as hexachlorophene or G11 soap A brief lathering with this soap is claimed to be more effective than the usual scrubbing, and the antiseptic action is believed to persist for a fairly long time On the other hand, in an address to the American Surgical Association Price[5] has described experiments which, as he interprets them, expose the fallacy of this "current surgical fad" Tests for the evaluation of skin disinfectants are notoriously unreliable, and a new "spot test" was devised in which a funnel was pressed against the skin and samples of skin washings were taken from the interior A single washing with G11 soap achieved the same reduction in bacterial count as did ordinary soap In order to maintain a low count, the soap had to be used many times each day, there was then a prolonged effect due to persistence of a residual film Bacteria were not prevented from increasing within the surgeon's rubber gloves The results of the spot test compared unfavourably with those obtained with the usual scrub and alcohol wash There were also differences in the sensitivity of the flora of different persons to G11 Price's conclusion is that G11 soap has been greatly overrated, and that unless its limitations are realised its use may create a false sense of security He recommends that the surgeon should wash his hands and arms with ordinary soap without a brush for three minutes, trimming and cleaning the nails the hands should then be dried with a sterile towel and washed for 60 seconds in 70% alcohol with the use of gauze or a wash-cloth In discussion, a number of surgeons rose in defence of the G11 technique and gave figures in support of their views Some of those figures, which showed marked reduction in bacterial counts of the hands after the use of G11 are subject to the fallacy that with this compound a bacteriostatic amount of antiseptic may be very readily carried over to the culture medium Others consisted of records of low infection rates in hospitals using the soap—figures to which many other factors clearly contribute The value of G11 soap remains undecided, but Price's careful scientific approach must carry weight. It would seem safer for the present to *follow his recommendation which does not differ* materially from that of Ogilvie,[6] expressed in THE LANCET War Primer on Wound Infection Ogilvie advised the use of a soft nailbrush for a preliminary 5-minute scrub in warm running water; and he urged the use, after the alcohol wash, of dry-sterilised rather than boiled gloves to minimise the dangers associated with accidental puncture

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[1] Brown J O Satinsky V P *Amer J med Sci* 1951 222, 613

[1] Price, P B *J infect Dis* 1938, 63, 301

[2] Colebrook L *Bull War Med* 1941, 2 73

[3] Gardner, A D, Seddon, H J *Lancet* 1946, i, 683 Gardner, A D *Ibid*, 1948, ii 760

[4] Murphy, J J, Dull, J A Gamble J, Fultz C Kretzler, H, Ellis, H Nichols A Kucharczuk, J, Zintel, H A *Surg Gynec Obstet* 1951, 93, 581

[5] Price P B *Ann Surg* 1951 134, 476

PROPRIETARY AND APPROVED NAMES

AN address by Mr F Hartley PH D on the Nomenclature of Drugs[7] has drawn fresh attention to an intractable problem Manufacturers cannot be expected to spend considerable sums on pharmacological and pharmaceutical research unless they are allowed to recoup themselves by the temporary reward of proprietary rights in the results When they have brought their product to market under its chosen name, there follows a stage at which variants or improvements appear The Trades Marks Act provides one kind of statutory protection and the Patents Act may or may not provide another; but often the same manufacturer or his competitors will soon be marketing rather similar substances, with rather similar properties, under a confusing diversity of labels. The physician must then distinguish several ranges of probably polysyllabic and possibly unrevealing nomenclature If he prescribes one substance with disappointing results, it is conceivable that he may turn to another without realising that it is no different. The pharmacist in his turn has to look up capital to stock his shelves with several brands of the same product, competitive salesmanship inviting purchasers to demand one kind rather than another Enterprise in research deserves its reward, but it is hardly tolerable that when a new drug is invented twenty different manufacturers should market it under different names.

In Utopia the problem might be solved by granting the State a monopoly of chemical research but, perhaps fortunately for scientific progress, we have not yet reached this particular Utopia. As things are, we look to see what can be done by the World Health Organisation or by the Pharmacopœia Commission's Nomenclature Committee. The latter has published lists of approved names' suitable for adoption by manufacturers An approved name as Dr Hartley observes, should be distinctive and easy to pronounce and (over optimistic as the hope may be) easy also to write and to remember Memory might be aided if the name conveyed some hint of the use or nature of the drug; but the commission, as he says, have decided that a recommended approved name should preferably be free from any anatomical physiological, pathological, or therapeutic suggestion His instances and reasons tell us why

Research in many lands is increasing the discovery of new drugs. The difficulty of naming them is enhanced by the possibility that names will also be needed for closely related chemical derivatives. Dr Hartley suggests that the only feasible solution seems to be to form names by combining syllables from the scientific chemical names in such a way as to indicate the chemical groupings of the molecules This would help towards the subsequent naming of the derivatives But he has no illusions about the prospect of obtaining names distinctive in sound and spelling easy to pronounce and remember, and safe from confusion with existing names—and all this within say, not more than four syllables.

Even when a new drug receives an approved 'generic" name in its country of origin the difficulties are not at an end For it remains possible for manufacturers abroad to register that name or something very like it, for their own exclusive benefit in their own countries thus profiting quite undeservedly from the international reputation it has gained In a vigorous protest against this practice the Council on Pharmacy and Chemistry of the American Medical Association[8] give a list of names that foreign manufacturers have registered (or have applied to register) as proprietary—among them cortisone, estradiol heparine, neostigmin procain hexyl resorcinol, and testosteron The council rightly hope that 'piracy of generic names for drugs eventually may be outlawed in the interests of universal scientific coöperation" We strongly share their opinion that "the generic status of nomenclature formally adopted by recognized scientific groups of any country should be universally respected by pharmaceutical manufacturers"

AURICULAR FLUTTER

THE cardiac cause of a rapid, regular pulse rate is not always brought to light by electrocardiography Sinus tachycardia, paroxysmal auricular tachycardia auricular flutter and more rarely nodal tachycardia may give virtually identical electrocardiographic patterns; their distinction will depend on clinical observation and on response to vagal stimulation and exercise tests In borderline cases of auricular arrhythmia if we rely on the usual criteria of differentiation, the diagnostic problem can be especially difficult but Prinzmetal's[9] work seems to explain this difficulty

Prinzmetal believes that the various electrocardiographic and therapeutic disparities between auricular tachycardia and flutter relate to variations in auricular rate and not to any fundamental difference in auricular mechanism in other words there is no sharp line of demarcation between tachycardia and flutter He has shown that each results from the same disturbance in the auricles—namely, the discharge of impulses from an ectopic focus at a rate greater than the rate of discharge from the sinus node and lower than the fibrillation threshold At slower auricular speeds within this range the characteristics of tachycardia tend to appear and at more rapid rates those of flutter His conclusions are based on experimental work in which high speed cinematography recorded the motion of the auricle induced to flutter by electrical stimulation and by local application of aconitine and the flutter waves were recorded by direct lead electrocardiograms. He extended his investi

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[6] Ogilvie W H. In *The Lancet* War Primer on Wound Infection, London, 1940

[7] *Pharm. J* 1952 168 17 23

[8] *J Amer med Ass* 1951 147 1570

[9] Prinzmetal, M. Corday, E., Oblath R W, Kruger H. E. Brill I C Fields J Rexford Kennamer S Osborne J A. Smith L A, Sellers, A. L. Flieg W Finston, E *Amer J Med* 1951 11 410

gations to man by employing œsophageal and precordial-lead electrocardiograms The mechanism of auricular flutter proved the same in both He demonstrated the entire course of the flutter-wave and thus established the invalidity of the hypothesis of circus movement, which for many years has been undisputed The contraction and excitation waves of auricular flutter arise from a single ectopic focus and spread outwards through both auricles simultaneously, like ripples on the surface of a pond when a stone falls into it, no circus movement is present Their course is identical with the course of the excitation waves of normal sinus rhythm, auricular premature systoles, and auricular tachycardia Electrocardiographically the high auricular rates of flutter produce an unbroken line of waves—"a continuous rise and fall like the teeth of a saw"[10] Prinzmetal suggests that this appearance relates to two components of the P wave, (1) a negative segment which represents the period of auricular depolarisation and is the counterpart of the distinctive P′ wave of auricular tachycardia, and (2) a positively directed wave representing auricular repolarisation, termed the TA wave The latter becomes visible only with rapid auricular rates and when auriculoventricular block is present Prinzmetal makes the interesting observation that the TA wave may be related to auricular strain due to overwork, for it is somewhat analogous to the electrocardiographic pattern of ventricular strain

Prinzmetal's researches on auricular activity,[11] based on Scherf's earlier work,[12] have revealed much that is new, they are likely to have an important influence on clinical cardiology in future years, and already confirmatory reports have appeared[13]

THE JACKSON LAB

OF very few scientific institutions can it be said that they are unique of still fewer that, like the Roscoe B Jackson Memorial Laboratory, they are unique in half a dozen ways This laboratory "for the study of cancer, genetics, and behaviour" has a permanent colony of 150,000 mice, and breeds upwards of a million a year, it has a staff of twenty-four research-workers and an enviable reputation that extends throughout the world, yet no university affiliation, it has no direct government or State grant, but its buildings alone are worth $2 million, it has no endowment even, but a young and growing Association, with members all over America, who help support it financially and with educational propaganda It is situated just outside Bar Harbor, one of the most beautiful of the summer resorts along the coast of Maine, not very far from the Canadian border, and it takes advantage of this and the heat of the summer elsewhere to house during June and July and August a considerable number of scientists from all over the States and beyond Besides these scientists, who come to write or to experiment with the unique genetic material the Jackson Lab provides, there are some three dozen university students each assigned to work with a senior investigator, and a similar number of secondary-school boys and girls who work as a group, under a biology teacher, on some project associated with research in animal genetics and medicine And if this is not enough there are those who say that its director, Dr C C Little, is unique also

Both reputation and physical status have been achieved in a comparatively short time The laboratory was founded in 1929, as a non profit corporation for scientific and educational purposes, by Mr Jackson of Detroit, Michigan, with Dr Little, a distinguished geneticist and former president of the University of Michigan, as director Mr Jackson died before the buildings were finished, but his laboratory has grown and flourished The main object was to study cancer and genetics, and from this beginning the work has spread downwards to the fundamentals of animal genetics and upwards to the breeding and sale of inbred strains of animals to other laboratories No human work is done at the laboratory, and amongst the zoologists, geneticists, and immunologists there are only two medical men, both pathologists Financial support comes from government and foundation grants to particular members for specific projects, and from subscriptions and donations from visitors, friends, and members of the Jackson Lab Association

Great emphasis is placed on the maintenance of inbred stocks of animals, particularly mice, rabbits, and guinea pigs Systematic inbreeding has produced mouse strains 98% or more homozygous, so that, when brought up under uniform environmental conditions, these animals are practically speaking one single mouse, blessed, for the experimenter's benefit, with many times nine lives. Such inbred strains are used extensively in the biological assay of drugs and in grafting and other experiments requiring uniformity of host—e g, in the study of cancer In the inbred nucleus, as the division of mouse breeding is called, are kept strains of mice carrying almost every known non lethal gene Some strains are susceptible to particular forms of cancer, some have particular endocrinopathies, some are long lived, others short-lived among them exist parallels of nearly all the degenerative, neurological, and metabolic diseases of man Such a central supply for genetic material is greatly prized by other scientists, and it is the particular pride of the Jackson Lab staff that, when their laboratory was utterly burnt out by a forest fire in 1947, supplies of mice for breeding were spontaneously returned to them from all over the world, and the first arrived within a couple of days of the disaster (The effects of the fire are still to be seen in the bare hills and charred country houses all around, but the Jackson Lab was rebuilt, larger, handsomer, more efficient, and considerably more fireproof)

Besides this animal breeding programme and all the research work on genetics in connection with it, there is a second and newer division, six miles from the main laboratory, which is given over to the study of animal behaviour Dogs, of which there are some 150, partly inbred, partly hybrid, are the main species studied, but rabbits, goats, and guineapigs also come in for some attention (Indeed the strain of genetically aggressive rabbits, which will attack any object presented to them, including the experimenter's fingers, has caught the imagination of the press in a way that diabetic mice could never do) The dogs are used in psychological studies in an attempt to determine the relative importance of genetic and environmental factors in behaviour Here lies, for example, a chance to test experimentally the hypothesis that maternal deprivation at particular periods leads to later emotional crises in the child, and *this is being done, in so far as the dog throws light on the human* (And neurotic dogs are commoner than is generally thought)

With the passage of infectious diseases, the study of human constitution and its aberrations is assuming more and more importance in medicine, animal work is *designed increasingly to throw light on this sector of the field* The Jackson Lab has pioneered such work and is in the forefront of it, suffused with the belief of its director and staff that between man and the rest of the mammals are few gaps that cannot be sympathetically bridged and that the study of one species will bring help and advantage to the others

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[10] Scherf D Boyd L J Clinical Electrocardiography London, 1948

[11] See leading article, *Lancet* 1951, ii 433

[12] Scherf D Romano F J Terranova, R. *Amer Heart J* 1948, 36 241

[13] Simonson E Berman R *Ibid*, 1951, 42, 387 Goldman M. J *Ibid* 1950, 40 93

Reconstruction

HAYGARTH HOUSE, HARLOW
BUILDING A HEALTH CENTRE

STEPHEN TAYLOR
M.D Lond , M.R C.P
MEMBER OF THE HARLOW DEVELOPMENT CORPORATION

THIS is the story of how the first health centre has been built at the new town of Harlow in Essex. In a sense, it is also the story of Britain s first health centre since it has been brought into use before any of the more ambitious projects elsewhere Yet too much must not be claimed or expected of this small and simple building It is an experiment it is temporary in the sense that it can be converted into two dwelling houses at the end of five years; it has cost under £6000 * to build and finally according to the law, it is not officially a health centre.

Yet because it is simple and experimental because it has all the essentials of a health centre whatever the law may say, and because it has cost so little to build this small health centre may be just as important as the mammoth departmental health stores, which many people think of when health centres are mentioned

The story would not have been written but for the timely generosity of the Nuffield Provincial Hospitals Trust; everyone concerned had reached agreement when an unexpected blow destroyed the finances of the plan With a grant of £2200 and a supplementary grant of £250 the Trust not only filled the financial gap but made it possible to reduce the number of general practitioner suites from four to three (with great improvement in each), to build four examination rooms, and to curtain the centre and furnish and carpet a number of the rooms

WHAT IS A HEALTH CENTRE ?

According to the law, a health centre is an official health centre only when it is provided by the local authority Section 21 of the National Health Service Act, 1946 has, in one respect, been widely drawn It lists every kind of non-specialist and specialist service (apart from the provision of beds) and says that a health centre may contain any or all of them Thus a group practice centre containing only general practitioners may be a health centre, if it is provided by the local health authority But a building containing general practitioners and local authority clinics is not in law an official health centre *unless* it is provided by the local health authority it will not be subject to ministerial approval as a health centre and consequently it will not attract unto itself a ministerial grant in aid

The Harlow health centre has been built and will continue to be owned (though not operated) by the Harlow new town Development Corporation So although the local health authority, the Essex County Council, has coöperated from the start and is renting the clinic accommodation the building is not a health centre within the meaning of the Act. In every other essential, however, it is a health centre

A health centre may be defined dynamically by stating precisely what it ought to do

1 It should provide the general practitioner with a surgery away from his home.

2. It should bring together under one roof two or more general practitioners, *as clinical colleagues working together* and helping each other at off-duty times and holidays.

3 It should make it possible for the general practitioners to have ancillary help

4 It should bring one or more dentists under the same roof as the doctors

5 It should bring the general practitioners with their diagnostic and therapeutic work into close working relations with the local authority preventive clinics antenatal and postnatal infant welfare and so on.

6 It should provide a point at which all the local and immediate health needs of the public can be met, and where they may receive health education in its broad sense

The pharmaceutical and optical services are omitted from this list only because it is not easy to devise an equitable way of introducing them Fortunately their presence is not absolutely essential to the conception.

There are up and down the country particularly in the smaller country towns many group practice houses excellently equipped and performing functions 1 2 and 3 and sometimes also 4 But the definitive feature of a health centre as opposed to a group practice centre is that it brings together the general practitioners and the local authority clinics, as set out in function 5 above

Group practice centres are often quite first-class to replace them by health centres would be wasteful in the extreme Here we should seek other functional bridges between the practitioners and the clinic services But in the larger towns, where practitioners' premises are so often poor where group practice is the exception and clinical isolation the rule and where practitioners and clinics live in different worlds, the case for true health centres is very strong

The Harlow health centre is a prototype of a true health centre because it brings the practitioners and clinics together In size it is no bigger than many group practice centres yet at any rate for a few years, it should suffice to meet the needs of the people of Harlow new town for both practitioner and clinic services.

HOW THE SCHEME DEVELOPED

New Harlow is now growing rapidly About 700 houses or flats have already been occupied and there are over 2500 citizens of the new town. During 1952, the corporation hopes to complete 1000 homes accommodating about 3500 people thereafter growth should continue at an increasing speed

The master plan for Harlow provides for four large neighbourhoods, with an average population for each of about 20 000 In each neighbourhood, there is to be one main shopping centre † and three or four small groups of " shops round the corner Sites have been selected near the four main shopping centres for four large county health centres to house both practitioners and clinics; and preliminary plans for the first of these centres have been prepared

With the rearmament programme and the limitations on capital expenditure, it became clear more than a year ago that there was no chance of the first of these large health centres being built soon Meanwhile, the people of new Harlow had to have both general practitioner and clinic services. The Ministry of Health suggested, no doubt as an expedient, that the corporation should consider building doctor s surgeries attached to ordinary houses. This the corporation was loth to do for two reasons First once surgeries attached to private houses were built the ultimate success of a health centre would be prejudiced; the practitioners and the clinics would have grown apart, and it would be very difficult to close the gap Secondly there would still be the problem of homes for the clinics. Although the corporation is building one small tenants' common room to every 500 houses, these are unsuitable for use as temporary clinics. So matters were discussed with the county health authorities the local executive council, and the local doctors, and the following plan was agreed

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* It is impossible as yet to state precise costs as the quantity surveyors have still to make their final determinations The probable cost of building is about £5300 to which must be added a share of the costs of roads sewers, and other general town expenses. About £1000 has been spent on furnishing.

† In one neighbourhood the main shopping centre will be combined with the town centre

In an attractive housing area under construction, called The Chantry, a pair of semi detached houses, planned but not built beyond foundation level, would be modified to provide consulting-rooms for two, three, or four doctors, and a dentist, and rooms for the county clinics Because the scheme was temporary, it was decided that the corporation should retain the ownership, letting the rooms directly to the doctors and dentist, and the county The county health authorities decided, not unreasonably, that within five years the building was likely to be too small for their clinic work, they hoped that by then at least a wing of the big health centre would be built So they were willing to lease the clinic rooms in the adapted houses for a period of five years only

The corporation therefore had to plan its finances on the basis that at the end of five years the building would revert to two dwelling-houses

New town development corporations get the same housing subsidies as local housing authorities, but apart from this it is their duty to make each new town over the years a self supporting entity This is an excellent discipline, but it meant that the health centre had to pay for itself over five years, or it must be abandoned

On the income side, were the following items (1) rent from the county for the clinic rooms for 5 years, (2) rent from one doctor for his consulting room for 5 years, (3) rent from a second and third and perhaps a fourth doctor for, say, 4 years, 3 years, and 2 years respectively, (4) rent from one dentist for 5 years, (5) rent from the tenants after 5 years, when the building had been reconverted into two houses, and (6) the ordinary subsidy on the two houses, when they had become dwellings The basic cost of building the two houses as dwellings would be covered by items 5 and 6 in this list Would items 1 to 4 cover the cost of special building, maintenance over 5 years, and recoversion ? The Corporation's chief finance officer decided that they would

Then the blow fell More in sorrow than in anger, the housing side of the then *Ministry of Health had to point* out that, unless the houses were first occupied on completion by ordinary tenants, the corporation would lose the subsidy, not just for the 5 years, but for the full 60 It was not the fault of the Ministry, but simply the way the law was drawn. So the chief finance officer recalculated the rents to be asked of the doctors, the dentist, and the county to make good this huge loss equivalent to £1100 They were impossible It looked as though the scheme was finished

It was then that the corporation decided to approach the Nuffield Provincial Hospitals Trust, with the result already mentioned

The letter from the Nuffield trustees arrived on March 16, 1951 On Jan 28, 1952, the health centre was officially opened by the Parliamentary Secretary on behalf of the Minister of Housing and Local Government The first patient had entered it a week earlier

THE PEOPLE CONCERNED

A new town is in many ways an ideal place in which to start a health centre There are no roots to be pulled up, either medical or lay Such a town is a cooperative effort The development corporation plans and builds the houses, shops, factories, and much else But the county council remains the local health and education authority, so it must build the schools and provide the clinics The regional board remains the hospital authority, it must, in due course, build the hospital The local executive council must contract with and pay the G P s and dentists, and, if need be, it must appoint new G P s So from time to time, the regional board, the county, the local executive council, and the corporation meet together to concert plans

As a long term policy, the *local executive council* agreed to the county proposals for major health centres, they also agreed that, as a temporary measure, the corporation should provide rooms for direct letting to the doctors, the dentist, and the county for clinic purposes As the town grows, a second and then a third general practitioner will be needed in the health centre It will be for the local executive council, if necessary, to advertise these vacancies and make ments. In doing this, they intend to have full regard to the views of the first doctor in the centre

The corporation is not concerned as to whether the doctors in the centre are in financial partnership It is, however, desirable, that they should be on friendly terms, and should coöperate clinically and over emergency and off duty times. The centre is too small for personal enmities

The *local health authority*, the Essex County Council, and in particular Alderman K E B Glenny, chairman of the county health committee, and Dr Kenneth Cowan, the county medical officer, have been no less helpful The county council decision to link the two sides of the centre by taking on the first general practitioner as the doctor for the antenatal and postnatal and infant-welfare clinics is most encouraging To build a link between the G.P s and the whole-time county staff, a whole time county medical officer will also attend to see school children and special cases

Because of the heavy use which must be made of the main waiting room, Dr Cowan has asked his health visitors to do all they can to get the mothers and children to treat the furniture kindly, they will also see that the waiting room is tidy at the end of each clinic, ready for evening surgery For reasons of space alone, friendly coöperation is essential, Dr Cowan has asked his fellow tenants not to hesitate to speak up if they have any complaints, for "if not dealt with at once, small troubles may fester and lead to great ones."

It is hoped it may be possible for the dentist to give one or two sessions for the county school children in his own surgery, there are special problems here, however, which have to be ironed out

The Nuffield Trust has asked that the general practitioners should have a *house committee* to decide about the detailed running of the centre Each tenant is, of course, his own master in his own sphere, but there is a common field of interest, where group decisions must be made.

A first meeting of this house committee is to be held in February All the general practitioners and the dentist will be members, and the county and the corporation will have one member each As soon as there are two general practitioners, they with the dentist, will have a majority vote The corporation will help the house committee by providing the limited secretarial assistance needed during its first year It may sometimes be desirable for the county or the corporation to send two people to the committee for example, the county M O H and the whole time M O working at the centre, or a member of the corporation and the chief finance officer to advise on some point about costs Such attendant advisers are not barred but they will not be committee members and will have no votes.

The first *general practitioner* originally joined the firm of doctors in old Harlow, with the purpose of entering a health centre in the new town as soon as one was established He has never wished to practise from his home, and has moved into the health centre thankful to have a proper home for his growing winter surgeries. The *dental accommodation* was advertised without satisfactory result Mutual satisfaction, however, followed an approach to Guy's Dental School We are indeed fortunate to have started with an enthusiastic doctor and dentist, each keen to make a success of the project

In Essex members of the *British Red Cross* take charge of the issue of steam kettles, bedpans, water cushions and the like, to those needing them at home, they also run home libraries for the bed ridden As a temporary measure, the corporation is allowing them to use, rent free, one empty consulting room and examination room as an office and store

Cleaning and caretaking are undertaken by the corporation for the whole building, rents are adjusted proportionately Each tenant is separately metered for gas and electricity, the corporation heating and lighting the common waiting rooms

PLANNING THE CENTRE

In planning the centre, a number of ideas were evolved, some of which may be found to have general application

1 Since reconversion to houses had to be faced at the end of 5 years, the smaller the deviation from the *original house designs* the better Thus, the following were retained two front doors (these will be used

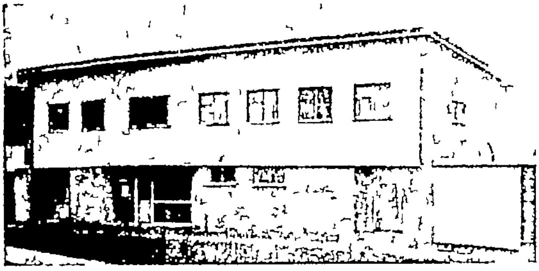

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Fig. 1—The health centre. Central entrance is for patients, side entrances for staff. Pram shed on right.

by staff, while a new central entry for patients has been made); two staircases; two downstairs and two upstairs lavatories (none unfortunately in suitable positions for patients' use, but all convenient for staff); and two small rooms designed as bathrooms (in one the bath has been retained, thus making a cleansing room for the local health authority, while the other has become a clinical side-room for the G.P.s.)

Again the closer the original house plans could be followed, the nearer would the cost of the health centre approximate to that of a pair of semi-detached 3-bedroom houses. This has forced those concerned to ask all the time: "In how little space can the users do their work?" Experience may prove that some decisions have been too ruthless, but the choice has throughout been rigid economy or no health centre at all.

One may speculate that if one tried to design a health centre ab initio, the cost would soon run into tens of thousands of pounds; the biggest single factor in keeping down the cost of this building has been the necessity to work within the physical volume provided by a pair of semi-detached houses. For any who may consider doing likewise, a length of 72 ft., a depth of 30 ft., and a height of 20 ft., will contain all that has been done.

2. Is it possible for general practitioners to have their consulting rooms for ordinary surgery work *upstairs*? A survey which I am making for the Nuffield Trust (the results of which will be published soon) has shown that some general practitioners use both ground and first floors for surgery purposes without serious difficulty. Patients who are well enough to come to a surgery are in fact capable of ascending one flight of stairs. Perhaps once a year a patient arrives with a stiff hip or some other disability which makes stairs impossible. So it is an advantage to have at least one consulting room at ground-floor level where such a patient can be seen.

This knowledge helped greatly. In an ordinary small modern house, the bedrooms upstairs are smaller than the living-rooms downstairs. Any large rooms available can be used for waiting purposes, while small rooms are quite satisfactory as consulting rooms.

3. The survey mentioned above has shown the great value to the general practitioner of a small *examination room* opening out of his consulting room. Here he can ask a patient to get undressed, while he is interviewing the next patient.

The minimum size of an examination room is, I think, 7 ft. 6 in. by 5 ft., with a height of 7 ft. (an extra 18 in. on the length is a great advantage if it can be achieved). Into such a room there will fit an ordinary surgery couch 6 ft. long and 2 ft. wide, a bedside locker beside the couch (for sphygmomanometer, &c.) and a chair at the couch end (essential for clothes, especially corsets, which will not stay on a hook on the back of the door).

The Nuffield gift made it possible to convert one upstairs consulting room into two examination rooms, and also to build out two further examination rooms on the ground floor. One of the upstairs examination rooms could gain daylight only by borrowing from a passage, but this is not a serious disadvantage.

Ideally each examination room should have had an exit door leading out into a passage (such a door should be capable of being opened only from the inside). It is an advantage if a patient can leave an examination room without having to go through the consulting room. But lack of space made this impossible.

Wash basins in examination rooms (partly to receive used gloves and fingerstalls) were considered. But they would have been a big extra expense and it is no real hardship to walk from the examination room to the consulting-room sink.

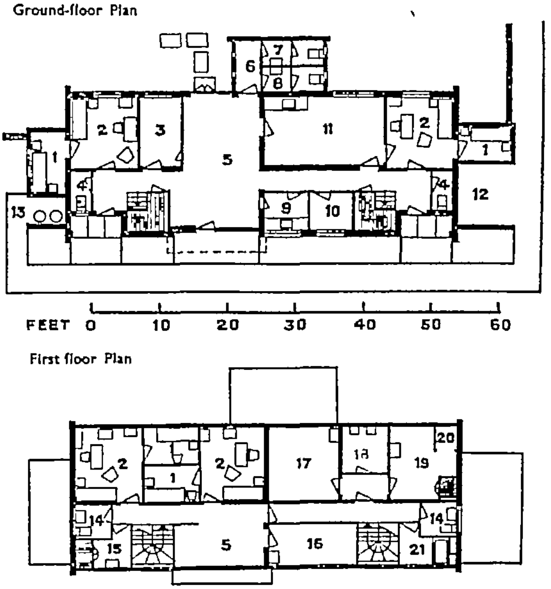

Fig. 2.

1 Examination room
2. Consulting-room
3 Office
4 W.C.
5 Waiting-room
6. Lobby
7 Women's toilet
8. Men's toilet
9 Kitchenette
10. Stores
11 Weighing and neonatal
12. Pram shed
13 Dustbins
14 W.C. and lavatory
15. Clinical side-room
16. Minor ailments and consulting
17 Main dental surgery
18. Dental mechanics' room
19 Subsidiary dental surgery with X-ray
20. Darkroom
21 Cleansing-room

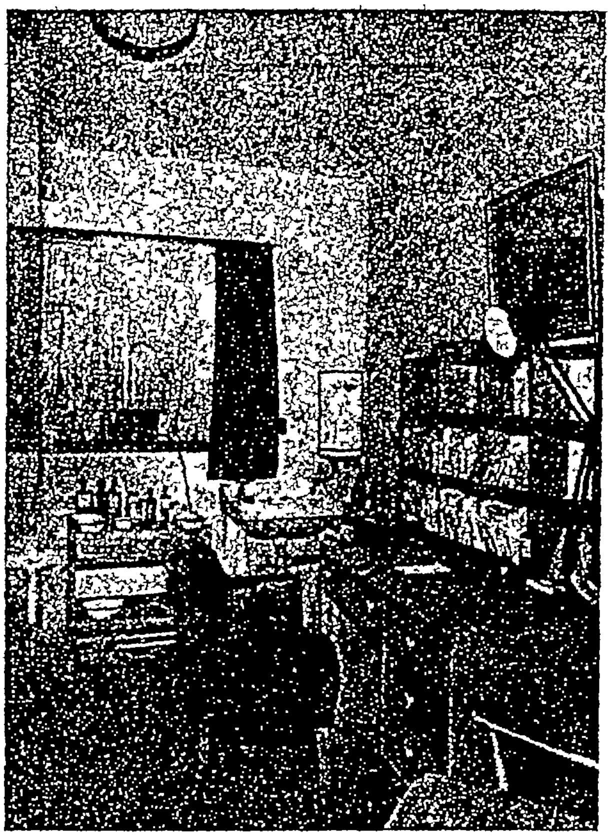

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Fig 3—General practitioner's consulting room (downstairs) Note rack for N H.S. medical record cards over desk, dinner trolley used as dressing trolley, and electric water-heater

The small size of the examination rooms presents a problem of heating On expense grounds central heating had to be ruled out, though if the building had been designed for use as a permanent health centre, a gas fired central-heating boiler would have been the right answer financially as well as for comfort. An examination room must be properly warmed, this is most needed where the room is built out from the house In so small a room, when a person is undressing, a gas or electric fire is dangerous A protected electric heater near roof level seems to be the best answer An alternative would be a 'Med ray' heating panel, or some similar device

4 *Consulting-room sizes* were determined by necessity The smallest is 10 ft 3 in by 9 ft 9 in This seems very small, but it is bigger than many a consulting room found in general practice today By a careful selection of furniture (light oak utility of Scandinavian design) it has been possible to produce an air of spaciousness A couch is provided in each consulting-room as well as in the examination room, experience will prove whether this is a real advantage

5 *Waiting rooms* are needed alike by the general practitioners and the clinics Broadly speaking the general practitioners' patients attend in the mornings and evenings while the clinic mothers and children attend in the afternoons Since space was so limited it was decided to get double use out of the waiting rooms There could be no question of a separate waiting room for each doctor, and in any event, with three doctors as a seemed rather unnecessary. But waiting space necessary on both ground and first floors

The main waiting-room is the largest room in building In the plan it looks big; in fact it is long, with an average width of 12 ft This is than the average general-practice waiting room, smaller than might be wished. It has been with great care Most of the chairs are small wooden ones, with washable green 'Rexine' seats; are strong and they look nice; they also give a of seats on a minimum of floor space In addition is a supply of folding Scandinavian bentwood reserve For stout parties, there are three really able wide armchairs For the children, there are wooden armchairs and a low round table. Those are waiting are asked not to smoke

The main waiting room is the hub of the centre So its walls are pierced by many doors openings On its back wall are French windows to the garden, these will be open on summer noons and evenings Next is the built-out lavatory block There is a common lobby for the men and women's lavatories, this could not be without great expense Each lavatory has a basin, as an encouragement to hygienic In the survey mentioned above, I have so far found one group-practice waiting-room with a lavatory, here, I was told, the towels were being stolen The best answer is to provide towels from machines To save money, water over these wash-basins were omitted.

As one enters the waiting room, the left-hand side for general practice, the right for the clinics On left is a hatch through to a small office, where the secretaries will ultimately work, and where the N medical record cards will be stored. It is not that the patients should handle their cards, but that the secretaries should deliver them in t to the doctors On the left also, suitably is the patients' entrance to the general and dentist's rooms On the right is the entrance the large clinic room, a door to a staff passage, hatch to a kitchenette, from which cups of tea are There are two Medici prints of Breugel paintings, and a portrait of Dr John Haygarth (1740-1825), after the centre is named

Upstairs is a small waiting space, 13 ft. by 9 ft furnished (a waiting space is a waiting room without a From it open the second and third G P consulting

Fig 4—Main waiting-room Note special table and chairs for children. The door at leads to patients' lavatories.

the dentist's suite, and a minor ailments clinic room, now in use as an office by the county's two health visitors.

When all three consulting rooms are in use most surgery patients will still wait downstairs. But the next two or three patients for each of the doctors upstairs will be called up in advance to the upstairs waiting space. When a doctor in an upstairs consulting room presses a switch on his desk, an indicator downstairs will call a patient up, warning him of a short wait upstairs, while an indicator upstairs will simultaneously call in the next patient waiting there. At the start of a surgery three presses of the switch will call up the first three patients, thus providing a "head of water" as it were; from then on everything will be automatic.

6. In accommodating the *dentist* the fact that the building is not in law a health centre has been a help. The corporation has been free to let the dentist rooms from which he can carry on ordinary National Health Service practice.

7. For its *clinics* the county required, besides waiting rooms, a large room for baby weighing, test feeding, specimen testing, and mothercraft instruction; a consulting room (to which was added an examination room); a minor ailments room (for the treatment of minor school casualties); a cleansing room (apparently statutorily necessary, but in practice probably unnecessary in a new town); lavatories, storage space, and a kitchenette. All this is found. The large room is 17 ft. 6 in. by 10 ft., and from it opens the consulting room. The minor ailments room had to be fitted in upstairs, but since patients will usually be taken up there by the health visitor this is no great inconvenience.

8. The waiting rooms and general practitioners' consulting rooms are *furnished* in as homely a style as possible. Thus instead of a glass and white-enamel instrument cupboard and trolley there are a light oak bookcase with cupboards below and glass sliding doors above, and a small but sturdy light-oak dinner trolley. In the consulting room the patient sits in a comfortable modern easy chair.

Until the first doctor can afford a secretary he must look after his own N.H.S. record cards, so three shelves, each divided into five sections, are fixed on the wall immediately above his desk. Here, filing his cards vertically edge-on to the wall, he can keep 3000 all accessible to him in a moment.

To get extra light in the examination rooms, spot lights such as are used for shop window displays are being tried. Two bright Scotch flannel patterns have been chosen for curtains, one for the ground floor, the other for the first floor. In consulting and examination rooms only net curtains are fixed; these are less expensive and more pleasing than frosted glass. Since the doctor downstairs is not expected to go upstairs to test his specimens, he has a small shelf and a gas tap alongside his consulting room basin. In each examination room there is a height measure on the wall, and a weighing machine under the examination couch.

Finally a Medici print of an old master is hung in each consulting room and in each examination room; for the latter a picture showing plenty of detail has been selected to occupy the mind of the patient who has to wait.

9. *Outside* there is a small pram shelter and a hidden recess for dustbins. At a late moment, it was realised that with no central heating there would be difficulty over disposal of contaminated surgery waste. A small gas-fired incinerator has therefore been installed.

10. One of the reasons why the health centre has cost so little is because the *room heights* are precisely those of a small modern house, namely 8 ft. on both ground and first floors. For some strange reason, when any kind of public building is planned, ceilings are immediately raised. What is supposed to go on in this upper space above our heads, I do not know. The extra height makes the rooms so much harder to heat, and height per se does not improve ventilation. Where one is striving for a friendly and informal atmosphere, as in a small health centre, the home height as against the institution height has everything to commend it.

11. The *architects* of the health centre, as well as the whole housing area in which it is situated, Maxwell Fry and Jane Drew, F.R.I.B.A., and partners, have been continuously helpful in devising practical ways of meeting changing demands. Above all, they have managed to produce a building with an air of authority about it, a tribute perhaps to the original design of the two small semi-detached villas from which it has evolved.

THE PATIENT LOAD

How large a population will this simple health centre serve? Three general practitioners, each with 3000 on their lists, would be looking after 9000 people. Is the waiting accommodation big enough for the corresponding peak load? It is expected that it will just carry the load, but only with occasional overcrowding.

On the dental side only the roughest approximation is possible. Today there is one dentist for every 4400 of the population.[1] To meet needs fully, one dentist for every 1500 may well be required, or two dentists for every general practitioner. To expect any such figure for many years to come is quite unrealistic; it may be wise to take as a minimum one dentist to two general practitioners. To achieve this, a second health centre with three doctors would need two dentists to balance things up.

As regards clinics, an arbitrary element enters in. It is a matter of opinion as to how often a healthy mother and child should be seen. For the purpose of calculation one assumes for antenatal and postnatal care 10 attendances, per mother and child, spread over the appropriate period, and for infant welfare 25 attendances similarly spread. This gives as the number of clinic attendances, per week, per 1000 of population at the present birth rate, the following:

Antenatal and postnatal	5
Infant welfare	7

This should justify one antenatal and postnatal clinic, and one infant welfare clinic per week per 3000 population. In other words, with 9000 population six clinic sessions a week would be needed (or five with slightly bigger clinics). On this basis the clinic side of the health centre should be just capable of carrying the load imposed by a 9000 population.

Imagine three health centres of the kind here described. Together they should cost about £20 000 to build and equip. Worked to the utmost capacity they should meet most of the basic health needs of 27 000 people. Suppose the load of the three is reduced to 20 000. Two less general practitioners would be needed; in one centre their consulting rooms could be replaced by a second dentist's suite. In each centre, the clinic loads could be reduced to reasonable figures and overcrowding of waiting rooms reduced. If the centres were built for permanent use, there is no reason why the economic rents for the tenants should be excessive. In other words, they could pay for themselves.

The idea of converting two semi-detached houses into a temporary health centre was born in the mind of Mr Eric Adams, C.B.E., general manager of the corporation. Financial planning has been carried out by Mr B. H. Harvey, the chief finance officer. Mr V. Hamnett, the corporation's executive architect, has skilfully interpreted lay views to Messrs. Fry, Drew and Partners. Finally the corporation's chairman, Mr Richard R. Costain, O.B.E., has by his insistence on the need for making the finances balance driven home a prerequisite for success on such a venture as this.

* The general practitioner working at the centre is C. M. Taylor, M.B. Aberd.; the dentist is M. M. Keen, B.D.S. Lond., L.D.S.

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[1] *Lancet*, Jan. 12, 1952, p. 88.

the large almoners' department, which has been cramped in a small bomb shaken building Alterations to the completed plans were made by the Ministry of Health The approved plans were transferred to the regional board in 1948 and construction was begun in 1950 Today the new building is complete It is none too soon The population of the area served by the hospital has increased greatly in the last twenty-five years, and even with the existing inadequate facilities well over 200,000 outpatients were being seen yearly Now that the hospital is fully staffed with consultants it has become imperative to have more accommodation

The patients of all departments will be seen in the new building except those of the obstetrical and gynæcological units, who, it is hoped, will eventually be housed separately Patients attending the department of physical medicine will eventually also have separate facilities The busy receiving and casualty units are housed in the new building (as many as 80 patients may be admitted daily) Also included are a diagnostic X-ray department, a large dental centre, a pharmacy for out patients, an audiometric room, a chiropody department, a room for the dietitian, and a records department The last will be especially valuable because shortage of space has hitherto prevented the hospital having a centralised record store and department with all the advantages that accrue from it Admittedly, the new building, having been so long in creation, will barely meet existing needs, and therefore gives little scope for development Moreover it falls short of the ideal in various ways for example, the absence of any dressing cubicles will oblige patients to undress and dress in the consulting rooms, and the almoners are farther away from the clinicians than one would wish But the medical staff will certainly be very pleased to work in the new department instead of the old inadequate quarters The impression made by the hospital on patients will be very different, and a much improved service will be possible

At the formal opening on Jan 24, Mr R L GALLOWAY, F R C S, the medical director, described the origin and development of the department, and Mr FRED MESSER, M P, who opened it as chairman of the North-West Metropolitan Regional Hospital Board, spoke of the board's pride in its completion

The building was designed by Mr C D ANDREWS, F R I B A, architect to the board

Medicine and the Law

A General Practitioner with a Whole-time Hospital Post

AN unusual case was reported by the medical service committee to the London Executive Council during January on a reference from its general benefits committee

Dr X, it appeared, had, while registered as a principal practitioner on the council's medical list, also held a full-time appointment as senior registrar at a hospital 12 miles distant from his surgery He had applied in May, 1948, to join the list for general medical services and maternity medical services, stating his hours of attendance to be from 9 30 to 10 30 A M and from 5 to 6 P M on weekdays and by appointment on Wednesday and Saturday evenings and on Sundays In November, 1948, he altered these hours to from 9 to 10 A M and from 5 to 6 P M on Mondays, Wednesdays, and Fridays, urgent cases by appointment on Tuesday, Thursday, and Saturday evenings In June, 1949, he stated that he would like "to train an assistant under the trainee scheme by which I get a grant" The application was accepted, he received the conditions attached to training grants, and a Dr P indicated that she was applying for the post of trainee Later a form of claim was sent to Dr X for completion It required the trainee's signature, but Dr P refused to sign She said she had been dissatisfied with the conduct of the practice and had so told Dr X who thereupon gave her notice with a week's pay In the absence of her signature the council could make no payment

As the result of a questionary issued last August, Dr X had asked that his name be removed from the list of general practitioner obstetricians, and this was done He had at no time applied for permission to employ an assistant or indicated that he was not conducting the practice personally Last November the council had learnt that he held a full time appointment at a hospital in one of the Home Counties As he was at that time responsible for the treatment and care of over 2000 patients under his contract with the council, he was asked for his comments He referred the council to a letter of October, 1950, of which the council had no record, he later sent what purported to be a carbon copy, it stated that Dr W would henceforth be acting as his full time assistant and that, unless the writer heard to the contrary, he would assume that the consent given to Dr W to act as his trainee assistant would continue for her new status It was ascertained from the hospital concerned that Dr X had been employed there as a full time medical officer since Aug 2, 1949 During the investigation Dr X told the medical service committee that his hours of hospital duty were two 24-hour days and four mornings in every seven days, leaving one free day in seven

The facts found by the committee were that Dr X, admitted to the council's list as principal practitioner in July, 1948, had been a full-time medical officer at a hospital 12 miles away since August, 1949, his list of National Health Service patients for the whole of the latter period being in excess of 2000, that he had claimed and received £777 7*s* 11*d* for training a trainee assistant over the period from November, 1949, to October, 1950 and that from October, 1950, he had employed a full time assistant without the consent of the executive council In the committee's view he had not complied, or attempted to comply, with clauses 6(1), 7(3), and 8(1)–(3) of the Terms of Service He had accepted a substantial sum from public funds for training an assistant when he was not in a position to train He had taken advantage of the National Health Service to draw remuneration from a hospital appointment while maintaining a practice with a list of over 2000 patients by employing the services of an inexperienced practitioner, using the official scheme of training practitioners as a substantial means of paying the assistant "We regard his conduct as dishonest" The committee recommended (*a*) the withdrawing of £1000 from his remuneration, (*b*) a representation to the tribunal under section 42 of the 1946 Act that his continuance on the medical list would be prejudicial to the efficiency of the service, and (*c*) the taking of counsel's opinion with a view to proceedings against Dr X in respect of his claim for payment for training a trainee assistant when he was not in a position to superintend the training adequately

General comment must be suspended, but it seems a matter for inquiry how Dr X came so readily to be accepted as the trainer of an assistant

Appeal to the Privy Council

Dr A J Daly has lodged an appeal with the Judicial Committee of the Privy Council against the decision of the Medical Disciplinary Committee of the General Medical Council to strike his name off the Medical Register[1] This is the first appeal to be lodged under the 1950 Medical Act The hearing is not likely to take place for some months

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[1] See *Lancet* 1951 ii, 1085

In England Now

A Running Commentary by Peripatetic Correspondents

I CAME across it in *The People's Common Sense Medical Adviser, in Plain English*, published in Buffalo, N.Y., in 1886. 'Sassafras-Pith,' it says, 'is a good mucilaginous drink.' I was delighted. I had been needing a mucilaginous drink for some time and not known where to turn. Now the merits of Sassafras Pith were revealed I could wait no longer. It was 10.30 on a Monday night and raining, but my local chemist lives above his shop, so licking my lips, I went round to knock him up.

The chemist answered the door in his dressing-gown. 'Hullo, old man,' I said politely enough, 'let me have a pound of Sassafras Pith, will you?' He closed the door to a crack and applying his lips to it as to a mouth organ muttered sulkily, "A pound of what?" 'Sassafras-Pith,' I repeated firmly; 'I'm not particular about the quantity; perhaps you sell it in ounces or scruples or something?' From the way his bloodshot eye flickered I could see he wasn't really on to it. He probably lacked concentration. 'As a scientific man,' I explained carefully, 'you will naturally possess a much thumbed copy of *The People's Common Sense Medical Adviser in Plain English*, and will doubtless recollect the remark on page 728, in the plainest of plain English, that Sassafras-Pith is a good mucilaginous drink. I have a severe mucilaginous thirst on me tonight and I merely want to apply that important statement.' He seemed impressed and opened the door. "Come in," he said briefly, and added, "I probably won't be able to lay my hands on it right away. The demand has fallen recently." He seemed saddened by this—probably the fall in Sassafras Pith sales meant a considerable loss of money for him. However he went on cordially, "Perhaps you'd like to search down here yourself while I look round the stock room upstairs?"

He slapped me on the back and left me confronted with dozens of little brown drawers marked cryptically in gold letters. I searched them systematically while the occasional clinking of bottles upstairs told me that the chemist too was hotly pursuing the elusive Sassafras Pith. At the end of an hour I closed the last little brown drawer and was thirstier than ever but no nearer the mucilaginous drink. I shouted up the stairs, "Any luck, old man?" The chemist came down carrying a tumbler and singing cheerily, "No, No, No, No." I disliked his attitude. "I realise," I said scathingly, "that this is only a suburban pharmacy, but surely that is no excuse for allowing your stocks of vital drugs to become depleted. Besides being completely deficient in Sassafras-Pith, I note with sorrow that you apparently lack supplies of Pipsissewa, Black Cohosh, and even Red Poccoon—all drugs held in high esteem by the *Common Sense Adviser*." This stung him. He held his hands to his head and began to croon huskily, "No Sassafras-Pith, no Pipsissewa, no Black Cohosh, and no Red Poccoon."

I left in dignified silence. As I turned the corner I heard him singing in a rich baritone, 'Come back at noon for the Red Poccoon.'

* * *

It is a sad reflection that as we become nominally more civilised time becomes more and more important, yet on the whole is spent less and less profitably. In fact for most of those living in towns clocks seem to be more a symbol of their enslavement to some dull routine than a welcome marker of the passage of happy hours. Perhaps it would be better if most clock faces were masked, and certainly if (as was the case at my own hospital till recently) they lied inconsistently or had two or more faces. We might then again hear the sound of bells seven times daily, or, for the deaf or those with the not-so-atavistic rhinencephalon, clocks which distilled perfumes at appropriate times to put one in the right mood; of the market-place when it's shopping time, of rabbits when it's their feeding time; of roast goose when it's dinner time, and so on. I can't believe any mother would have any difficulty in getting her children to bed if the wireless exuded a smell of soap and toothpaste at the end of P.C.49, and the television showed water running into a bath.

* * *

What appears to be a fragment of a letter *from* posterity was found the other day inside the shattered cathode-ray tube after my television set had exploded with a loud report. If the letter is genuine, our descendants have devised an ingenious way of communicating with us. Here is the text, with some comments of my own. The reader will note the mild form of simplified spelling adopted, and several examples of today's slang becoming the accepted usage of tomorrow.

Dere great-great grandfather,

It is a privilege to howdy you with the deepest respect, tho I do not know your name. I hope this letter will survive the 100 years' journey on reversed lite-rays projected to the star Ambega[1] and reflected back to the earth; but some charring is inevitable.

As you are no doubt interested in the nature of our society I shall try to give you a general picture. The most striking difference from your day appears to be in the public helth. We are much helthier than you were—the total organic-disease-rate in Britain last year was 76 per million population; 29 per million being fungus infections, mostly penicillioses and streptomycoses. As you may have foreseen, the moulds have gradually gained the upper hand, first over bacteria and then over viruses; they are now the chief menace to both plants and man. Much of the improvement is the result of extended applications of materials and methods discovered in your day. Every infant must be koccinated[2] at birth, and flenching[3] every three years is compulsory. Koccination has completely eradicated tuberculosis here, tho a few cases still occur in India and China; our history books tell us that koccines were introduced just 100 years ago. Flench is a mixture of antibiotics and hormones in various proportions in a slowly diffusible base of cadmium protamine bilinoleate. One of its essential constituents is 'P.A.H.' (pineal antimitotic hormone), a deficiency of which was shown in 1958 to be the sole cause of malignant disease. In flenching, a tablet containing the dose appropriate to the person's age and sex is implanted at the back of the sholder.

We have fewer doctors than in your day, and 90% of them are 'geepems' (graduates in psychological medicine) who deal only with mental health. Mental health centers (the first of these has just celebrated its centenary) and geriatraria have supplanted most of your hospitals, tho a few of your original buildings are still used, mainly for the diagnosis of great rarities. What would strike you as the most revolutionary change would be in the work of the other 10% of doctors. Their job is entirely

Here the fragment, rather annoyingly, came to an end.

* * *

I have been shaken on several occasions when medical friends and acquaintances who ought to know better have assured me that the peripatetic correspondents of *The Lancet* are full-time or part-time members of the editorial staff. Even a man on the senior staff of a London teaching hospital expressed this view; and my timid remark that anybody's contribution would be accepted if it was suitable, with a hint that I had contributed to these columns myself, was received with frank disbelief. My friends obviously thought me incapable of seeing the funny or seamy side of life, let alone writing about it. Some went so far as to accept the existence of a person like 'Rudolph' in the radio feature *Take it From Here*, who, like Tommy Handley's Peter Geakie, is always on the spot when any unexpected and funny thing happens. I had to own that there's a divinity of some kind in *The Lancet* office that shapes our ends, rough hew them how we will.

* * *

Pedestrians are beginning to use the zebra crossings with more confidence, though some timorous mortals still start and shrink back despite the motorist's reassuring grins and gestures. A Finnish motorist is reported to have devised an illuminated sign on the front of his car which lights up with the word "GO" when he presses a switch. One grateful pedestrian, he says, acknowledged this clear directive by raising his hat. So far the only sign of recognition pedestrians have given me is a shake of the fist.

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[1] I cannot find this mentioned in any reference book.

[2] The derivation from Koch seems obvious.

[3] This is more difficult—could it be a combination of "Fleming" and "Hench"?

Letters to the Editor

ACUTE INFECTIONS OF THE FINGERS AND HAND

SIR,—I read with much interest the very practical article last week by Mr David Bailey However, I was surprised to read in table I that the length of disability for erysipeloid infection is 25 1 days—i e, twice as long as in the 1947 series—whereas almost all other types of infection show a greatly reduced period of disability over the following four years Also, since the majority of cases readily respond to penicillin a disability period of 25 days seems rather long

I note (with relief) that surgery was not required in these reported cases of erysipeloid I have reported[1] two cases in which the purplish area on a finger had been incised as an indolent whitlow Since then I have had under my care a patient whose flexor-tendon sheath of the left ring finger was opened by an over-enthusiastic casualty officer searching for pus These "accidents" would not occur if this not uncommon infection was more widely recognised The slowly spreading, purplish, intradermal lesion, with no constitutional disturbances, typically seen in butchers or fishmongers, is very characteristic Not only in a qualifying examination, but even for a higher surgical diploma, it is exceptional to meet a candidate who has any knowledge of "erythema serpens," which was the descriptive term given to erysipeloid infection by Morrant Baker, of St Bartholomew's Hospital, who described the condition in 1873

London, W 1 McNEILL LOVE

SIR,—Mr Bailey is to be congratulated on the second report from the University College Hospital clinic, and on the results of further work there without change in the principles of treatment I would not further dispute that they represent "a standard rather than a goal," particularly as he refers to a standard which for the most part we, with many others, have adopted as our own I can assure him, however, that we (again with many others) are likely to adhere to our preference for general anæsthesia, and to agree with at least one surgeon who announced that no one, if *he* could help it, was going to stick a needle into *his* median nerve

Mr Bailey reminds us that old and less effective methods are still in common use, and that standard textbooks still give unacceptable guidance on the treatment of septic hands We are at one in condemning the hockey-stick incision as the routine treatment for pulp space infection Perhaps Mr Bailey failed to emphasise sufficiently that the inexperienced use it not only for early infections but for late, discharging lesions I still believe that an occasional *early* pulp infection will benefit from a hockey-stick incision, but to use it for the late ones is to cut off a vicarious blood-supply to the phalanx, when the phalanx has already lost its nutrient artery by the inflammatory process The highest incidence of sequestration and of bony disease in general occurred in our series in 1948, when the hockey stick incision was most frequently used Since decompression has been obtained by conservative treatment and local incision, we have almost eliminated sequestration There have been only 3 gross sequestra in this clinic in the last 400 cases of pulp space infection

In discussing the complication-rate of pulp space infections, I think that we need a precise definition of what we mean by osteitis Bone can become inflamed without any destruction of its living substance, just as soft tissue can The swelling, redness, and heat of an early soft tissue inflammation have a counterpart in bone in decalcification, even to the total loss of radio-opacity The characteristic X ray picture of loss of shadow from the volar surface of a phalanx, commonly regarded as a complication, may indicate the destruction of the bony matrix but more often indicates simply a hyperæmic decalcification which may return to normal within a week or two—sometimes even before the soft-tissue lesion has healed This accounts for wide variation in figures for the incidence of "osteitis," and variation in figures quoted by different people for regeneration of *bone after it*

Inflammation of bone, therefore, is commonly not so much a complication of the infection as a normal reaction to its proximity The only incontrovertible (though admittedly incomplete) evidence of bony complication is a gross sequestrum, or the direct observation at operation that part of the bone is missing According to these principles, Mr Bailey's 21 "probables" become 14 "certains", and in my view this figure is commendably low

Apical infection is, as he says, a clinical entity, and like him we have never seen it progress to sequestration. Localised rarefaction of the tip of the phalanx is not uncommon

Again like Mr Bailey, we have found that the steady reduction in average disability has one notable exception —in paronychia We find that this is uninfluenced by promptitude in seeking treatment, by the use of penicillin, or (within limits) by the operative routine adopted. We did alternating cases according to the Kanavel routine and according to the recommendations of Pilcher et al[1] There was no significant difference in the averages for the first 100 of each The average case of paronychia can be expected to heal in 7–8 days whichever way it is treated, but there are always a few (especially in dirty little children) where the exposed nail bed granulates and produces persistent discharge I do not believe that opening the subcutaneous tissue by reflecting a flap makes much difference either way The trouble lies in the necessity of having to remove *any* nail I agree, however, that if nail must go the whole width of the base must be removed We are at present trying massive doses of penicillin preoperatively, an incision alongside the nail base, the evacuation of pus, and the preservation of all nail as suggested in a personal conversation by Mr Maurice Ellis

We are not as yet concerning ourselves with the problem of penicillin-resistant strains Our last survey gave 29 out of 30 consecutive cultures from fresh, operative pus as penicillin-sensitive staphylococcus The penicillin-resistant staphylococcus, like the gram-negative organism, seems to be hospital-bred[2], and the solution still lies in preventing secondary infection rather than in cure.

Finally, Sir, Mr Bailey and yourself have done all hospitals a service by reopening the subject I estimated recently that more than a quarter of a million people attend hospitals every year with septic hands Professor Pilcher and his team, as I know from experience, offer a most courteous welcome to anyone who visits them In this communication to your journal they have contributed again to the establishment on a rational basis of the use of penicillin in these conditions, and to restoring intelligent and progressive surgical technique to the forefront of treatment

Sunderland THOMAS G LOWDEN

TOXIC CHEMICAL SUBSTANCES USED IN AGRICULTURE

SIR,—It has been stated that there are no sequelæ to poisoning by organic phosphorus compounds used as insecticides

In August, 1951, three people developed symptoms of acute poisoning following exposure to a new substance in this group—*bis* mono *iso*propyl aminofluorophosphine oxide Although these symptoms responded in the usual way to the administration of atropine two patients developed flaccid paralysis involving all four limbs which came on slowly in the third week after the acute phase of the illness. The lower limbs were affected first and most severely and have not yet recovered fully The case will be described in detail in a report which is being prepared for publication

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[1] *Brit med J* 1949 ii 1411

[1] Pilcher, R S Dawson R L G, Milstein, B B, Riddell, A G *Lancet* 1948 i 777

[2] Summers G A C *Ibid*, Jan 19 1952, p 135

The purpose of this letter is to draw attention to the fact that paralysis resembling that which follows poisoning by tri-*ortho*-cresyl phosphate may also occur after poisoning by other organic phosphorus compounds. Petry[1] records a case of similar paralysis in a man exposed repeatedly to 'Parathion' in the fumigation of greenhouses.

Department for Research in
Industrial Medicine,
London Hospital

P LESLEY BIDSTRUP
DONALD HUNTER

ECONOMY IN X-RAY FILM

SIR,—Dr Martin, in his letter last week has dealt with Dr Brailsford's disparagements (Jan 19) of clinicians but Dr Brailsford's attack on the Ministry of Health and regional boards needs rebuttal There is no truth at all in his statement that 'the administrators of the N H S appear to be more concerned with show than with quality of service ' New X ray apparatus is bought by the supplies division of the Ministry according to the requirements of the regional boards and boards of governors and they in turn are advised by the radiologists who use it

London W 1

S COCHRANE SHANKS

SIR,—Dr J F Brailsford has a surprising and quite unwarranted, *faith in clinical diagnosis* He seems to forget that the only diagnostic instrument of any real value is the human eye and that as the unaided eye cannot see beneath the surface of the body it is quite impossible to diagnose clinically a disease which does not produce some surface lump or blemish Thus a clinician can recognise, with a fair degree of accuracy such diverse maladies as hernia, measles, dandruff, and prolapsing piles. All other " diagnosis ' is mere suspicion or surmise, and over the years a vast array of ancillary services has been developed with one common aim to make the signs of internal disease perceptible by the visual sense Every " aid to diagnosis and every special test—the proctoscope the electrocardiogram the thermometer, the tests for sugar in the urine and urea in the blood, the microscope and, greatest of all the Röntgen ray—have this one aim in view The blind are at ease in many callings, but no medical Milton will ever tread the hall of Fame.

We have become so used to these devices that some clinicians think that they have made a diagnosis when they have referred a patient to the correct special department. How many radiologists would be prepared to submit to a cholecystectomy, a gastrectomy or a pneumonectomy on clinical evidence alone ? A few diseases such as chronic appendicitis still elude the preoperative eye, and the less said about them the better !

Dr Brailsford modestly underestimates the total dependence of clinicians on the ancillary services, and I am afraid he must accept the present large percentage of negative investigations as the price we have to pay for early diagnosis. Radiologists tend to forget the true value of the negative film, remembering only its nuisance value Some twenty years ago Dr Brailsford took an excellent and quite unnecessary film of my chest but I assure him that I remain extremely grateful for his very real service The clinicians perform thousands of " unnecessary ' sigmoidoscopies and cystoscopies, but they do not despair and they remember that no radiologist will dare to say a film is unnecessary until he has had a good look at it

Several of Dr Brailsford's recent letters have suggested that he holds the quaint belief that a symptomless patient is free from disease Can he not recall a single healthy young house physician with tuberculosis ?

A few weeks ago I operated on a man for hæmorrhoids While he was in hospital the nurse looked at his routine urine test it showed albumin. The bacteriologist looked at a specimen under the microscope there were staphylococci I looked in his bladder and found a mild cystitis. The radiologist looked at his pyelogram it *showed a functionless kidney with nine large stones* This man was, and is, symptom free but I propose to remove his kidney or should I wait until he develops carcinoma, and hæmaturia a symptom at last, and one that we can see !

Perhaps it would be better if the radiologists vented their spleen on the authorities who keep them short of film We are also short of butter we need more not less, of both We are selling film abroad, presumably for dollars and are buying films (of Betty Grable and other shapely opacities) for dollars Why not use a little common sense ?

Barnet General Hospital
Herts

V J DOWNIE

THE PREVENTION OF ECLAMPSIA AND PRE ECLAMPSIA

SIR,—I was extremely interested in Dr Hamlin's communication in your issue of Jan 12

Firstly, I wish to congratulate the staff of the Women's Hospital Crown Street Sydney, on their results in the prevention of eclampsia and pre-eclampsia. Our experience during the past few years has been very similar to that recorded in Dr Hamlin's paper despite the fact that my writings and those of Green, FitzGibbon, and Falkiner were pessimistic in 1947

Dr Hamlin attended the Rotunda Bicentenary Congress in Dublin in 1947 when the various factors since incorporated in the seven steps outlined in his treatment were discussed These have since been coördinated and put into practice independently in both centres It was at this congress that Gibbon FitzGibbon reaffirmed his *oft stated belief that œdema was the outstanding early* pointer to the likely development of toxæmia later in pregnancy

The comparisons by Dr Hamlin of statistics from various maternity centres are unfair to the Rotunda from two aspects

1 It is impossible to compare the figures of a few years ago with those of today Preventable or almost totally preventable diseases vary in incidence very rapidly once a rational means of preventing the disease has been applied His reference to the figures for the Rotunda for 1636 are of *course, totally out of place* I am conversant with affairs as they were then, and have the greatest respect for Collins's integrity and intelligence. As a former Master of the Rotunda his troubles were numerous, but Dr Hamlin must realise that relatively few eclamptics were admitted to hospital in those days ; a large number suffered and possibly died in their own homes. The records are in other words, misleading and the incidence of eclampsia he quotes for that time (1 in 600 cases) is not valid.

2 Dr Hamlin attempts to compare the most recent incidence of eclampsia in his hospital and the Rotunda on a basis that is untenable—i e his incidence is based upon the number of " booked patients whereas those from the Rotunda are (and always have been) calculated on the combined booked " and ' unbooked deliveries

Since I became Master (1947) we have delivered a total of 15 927 women *within* the hospital and in this number there have been only 15 ' booked eclamptics—an incidence of approximately 1 in 1000 The yearly figures for this incidence have fallen as follows 1947–48, 2 per 1000, 1948–49, 1 2 per 1000, 1949–50, 1 per 1000, 1950–51, 0 per 1000

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[1] Petry H *Zbl Arbeitsmed. Arbeitsschr* 1951 1 60

Without any knowledge of the activities in the Women's Hospital, Crown Street, Sydney, I reorganised our entire antenatal supervision in July, 1950, and it is possible that when some greater period has elapsed we may be able to record that there have been no cases of eclampsia in 5000 "booked" maternity patients

I am a little bit more cautious than Dr Hamlin and/or his associates who in 1950 felt they could say to the sceptics "Eclampsia will no longer afflict the patients of this hospital if the present methods of prevention are *followed meticulously*" I sincerely hope that his forecast and the promise in our own lesser experience will continue, for both treatments are based on the same concepts Both the Sydney and the Rotunda hospitals should be greatly indebted to the ex Master of the Rotunda, Gibbon FitzGibbon, who for many years preached that an abnormal gain in weight in early or mid-pregnancy was a more reliable forecast of impending toxæmia than the other more commonly noted clinical observations

I should add that, even though our "booked" eclamptic incidence has been reduced, we deliver by cæsarean section, or induce labour, when the child is well viable, to prevent eclampsia developing in non convulsive toxæmics whose condition does not improve steadily and satisfactorily under hospital routine

O'DONEL BROWNE
Master

Rotunda Hospital, Dublin

EFFECT OF VITAMIN B_{12} ON UNDERWEIGHT CHILDREN

SIR,—Considerable interest was aroused by Professor Wetzel's report[1] (mentioned in your leading article last week) of the gratifying results obtained by giving vitamin B_{12} by mouth to children underweight after long sickness or as the result of malnutrition

In 1950 and 1951 Messrs Glaxo gave a supply of this vitamin to the London County Council, and an extensive and carefully controlled trial was made, the full results of which it is hoped to publish later It is, however, possible to say that in children who were for the most part either recovering from an acute illness or had some chronic disabling condition like bronchiectasis or asthma, Wetzel's results could not be confirmed The administration of 10 µg vitamin B_{12} daily by mouth made no difference to the rate of increase of height or weight, or to the incidence of minor ailments in any group of children

B BENJAMIN
Statistician
G D PIRRIE
Principal Medical Officer

London County Council,
County Hall, London, S E 1

THE KIDNEY OF SCLERODERMA

SIR,—In your issue of Jan 12 Dr Moore and Professor Sheehan draw attention to renal changes in scleroderma

The term scleroderma is often used to include at least two separate conditions, in which the state of the cutaneous collagen is quite different Dr Moore and Professor Sheehan do not state to which form of scleroderma they refer, but from their brief clinical descriptions they are presumably dealing with the so called general form with visceral lesions In our opinion this disorder should not be called scleroderma at all but rather acrosclerosis—the name originally given by Hutchinson in 1893 This disorder is usually associated with circulatory disturbances of Raynaud type in the extremities and sometimes with lesions of œsophagus, heart, lungs, and kidneys

The distinction has become of clinical importance because of the encouraging response of true scleroderma to treatment with 3 hydroxy-2 phenyl cinchoninic acid (H P C), whereas in acrosclerosis the alterations in cutaneous collagen, which are of a different pattern, are unaffected by H P C therapy

We hope to publish a detailed account of our cases in the near future

JOHN A MILNE
JAMES SOMMERVILLE
J BASIL RENNIE

Western Infirmary, Glasgow

"IN UTILECON"

SIR,—This hospital is soon to receive a utility omnibus, and presumably our patients will then arrive "in utilibus"

KENNETH MARSH.

St Wulstan's Hospital
Malvern.

HERNIATION OF THE NUCLEUS PULPOSUS

SIR,—It is always a pleasure to read one of Mr John Charnley's papers—one is certain to encounter stimulating suggestions backed by ingenious experiment and presented with convincing persuasiveness

That published in your issue of Jan 19, and previously presented to the International Congress at Stockholm, is no exception Mr Charnley demonstrates conclusively that the fresh nucleus of the lumbar disc can, when directly exposed to saline solution, imbibe fluid so that the weight of the disc increases 60–100%, and that by so doing the nucleus generates pressures higher than the normal blood-pressure Mr Charnley further suggests that the simple imbibition of fluid might itself cause *acute low-back pain and might ultimately produce* annular rupture and nuclear protrusion, thus giving rise *to a full blown low back-pain sciatica syndrome*

It seems to me to be extremely unlikely that any such *suggestion is correct It is, I suppose, conceivable that* the properties of the cartilaginous end-plates or annulus fibrosus might be altered by some unknown factor (Mr Charnley mentioned exposure to wet and cold) so that these structures become readily permeable and allow the nucleus to imbibe the fluid and generate internal pressure within the disc I would suggest, however, that pressures so generated (those recorded in Mr Charnley's experiment were between 150 and 250 mm Hg) would be trivial in comparison with the pressures to which one of the lower lumbar discs is habitually subjected, and therefore that such pressures could not be expected to cause symptoms or to damage a normal annulus

The normal nucleus pulposus obeys the laws governing the behaviour of fluids—much of its function depends on this—and is therefore incompressible and transmits forces equally in all directions Any force tending to approximate contiguous vertebral bodies also tends to compress the nucleus and is transmitted by it equally in all directions so that it falls evenly over the entire inner surface of the end plates and annulus Compressing forces, which are maximal during activity, are produced by gravity, muscle tone, and muscle action, to which may be added mechanical forces from specific exertions During sleep disc compression falls away sharply, muscle tone being the only compressing force

The stresses to which lower lumbar discs are subjected have never been measured accurately, experiments carried out on cadaveric specimens being open to grave objections, but it is certain that they are both large and rapidly variable For example, it is quite easy to postulate specific actions well within the physical capabilities of the average man which would impose a mechanical pressure of more than half a ton on the L5–S1 disc (The production of such forces depends on the creation by the trunk and arms of a long anterior lever, forces acting through such a lever must be balanced by contraction of the posterior spinal muscles acting through a much shorter lever) Surely a rise of internal pressure of 250 mm Hg is unlikely to disorganise and finally burst a structure through which such immense pressures are habitually transmitted

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[1] Wetzel N C Fargo W C Smith I H Helikson J *Science* 1949 110 651

It is of course, quite true that the basic cause of lumbar disc lesions is unknown and as Mr Charnley has clearly pointed out, the low back pain sciatica syndrome is incompatible with a purely traumatic lesion It is also true that disc lesions are due to changes within the disc itself and not to any mechanical "slipping" or displacement It seems possible that the imbibition of fluid into nuclear material may play a part in the mechanics of symptom production when a disc becomes abnormal, but it is unlikely that the pathology of a lumbar disc lesion can be reduced to the simple statement that the affected disc 'swells up and bursts."

London, W 1 J R ARMSTRONG

SIR,—In his article Mr Charnley postulates that under certain conditions the intervertebral disc may acquire an abnormal amount of fluid and thereby achieve an abnormally high internal pressure, leading to the syndrome of acute lumbago If this hypothesis should prove correct he says, it opens up the future possibility of prophylactic treatment by medical means

As the result of clinical observation I have for some years believed that a similar mechanism is the cause of pain in one type of non articular rheumatism In these cases, however it is the fat tissue in certain sites which acquires an abnormal amount of fluid but since owing to an indistensible fibrous covering membrane it is unable to expand, pain is produced in those sites

Some years ago whilst conducting some experiments on the effect of dehydration in such cases,[1] we selected 25 cases of sciatica with clinical evidence of intervertebral-disc prolapse to act as a control group Contrary to our expectation in more than half the pain yielded in rapid and characteristic fashion, although usually only temporarily Where this was 100% successful the full effect was achieved within 10 minutes of the final saline injection, and the effect lasted 1–6 hours After this the pain either returned fairly rapidly or else re-developed gradually during the next 4–5 days not always in its former intensity In 3 cases the pain did not return, and the men left the hospital apparently cured

The cases which responded least satisfactorily tended to be those in which the condition was of long standing in which possibly the emerging nerve roots had become attached to the chrondral protrusion

These results which for various reasons we did not follow up, would seem to strengthen Mr Charnley's case, that the causal factor in certain cases of acute lumbago may be a condition of cellular hydration localised in the nucleus pulposus.

London, W 1 W S C COPEMAN

COLLEGES AND FACULTIES

SIR,—Your leading article of Jan 19 advocates the reintegration of the various branches of medicine and disapproves of "separatist movements that may presently fill the medical scene with quite a number of new colleges." But if the argument for reintegration is carried to its conclusion it must as Sir Ernest Rock Carling says involve the fusion of all the Royal Colleges into one Academy of Medicine including general practice Is there any sign that such a move is proposed—for the good of the cause?

In contrast to your rather nebulous discussion on whether the existing Royal Colleges are closed corporations of specialists, or colleges of medicine, surgery and obstetrics, may I propound the more concrete proposition that once general practice has its own college—independent and of equal standing with the other colleges—there will be some definite prospect for the reintegration of medicine Is not the general practitioner and only the general practitioner the last survivor of past generations who saw medicine as a whole? Who today practises it as a whole except the general practitioner? Let us proceed with the foundation of our College of General Practitioners let general practice come into its own, and let reintegration of British medicine become a practical possibility

Gateshead. K T BROWN

THE TREATMENT OF PEPTIC ULCER

SIR,—Dr Todd tells us in his article of Jan 19 that in order to discover the efficacy of any single remedy it is necessary to compare the progress of controlled series of patients treated with and without this remedy He then without recourse to this excellent method proceeds to damn the more inconvenient remedies and lauds alkalisation on the strength of a few flimsy arguments

Because it is hard to see why bodily rest should benefit the ulcer this is no argument against the fact that it does so I have published elsewhere a description of some clinical experiments on the effect of *recumbency* on the healing of gastric ulcer and some possible explanations.[1]

Two further points of confusion should be clarified The first is that the results of the medical treatment of gastric and of duodenal ulcer should be considered separately for they are diseases associated with different ages different social groups, and different degrees of gastric secretory activity The second is that the question of treatment of ulcer should be separated from the question of prophylaxis. That alkalis may relieve the pain of ulcer is undoubted but their efficacy in healing or in the prevention of relapse is less certain; possibly they are more efficacious in the latter rôle. Indeed in one almost achlorhydric sufferer from gastric ulcer healing did not occur in ten weeks administration of alkali, but it did occur when the patient was given weak hydrochloric acid to drink with meals.

When confronted with an ulcer case particularly an early one it is the physician's duty to leave the patient with as small and supple a scar as possible, and the most certain method of obtaining this is by early and adequate recumbency The slow and uncertain progress of healing under ambulant therapy will I believe lead to a higher incidence of ulcer complications and of chronic ulcer

St. James Hospital
London, S.W 12
NORMAN TANNER

SIR,—I must congratulate Dr Todd on his stimulating article

I should like to point out however that though he acknowledges that peptic ulceration may be relieved by constantly keeping gastric acidity at a low level he later criticises the prohibition of alcohol Best and Taylor[2] state in no uncertain terms the capacity of alcohol to provoke the secretion of gastric acid Surely Dr Todd is aware of the alcohol test-meal? It seems that restriction of alcohol in cases of peptic ulceration has a sound physiological basis

Manchester N BERLYNE

PREVENTION OF CORONARY THROMBOSIS

SIR,—It is remarkable that vitamin E is still recommended for coronary thrombosis despite many reports clearly showing that it is completely useless against this disorder Dr Shute (Jan 12) quotes many accounts as recommending vitamin E as a safe anticoagulant but possibly he does not know that others have recommended vitamin E as a very potent coagulant in hæmophilia and allied conditions in which a defect of coagulation is suspected [1] Furthermore, during a study of vitamin E in diabetes one patient had coronary thrombosis while taking a huge daily dose of this vitamin [2]

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[1] Copeman W S C Pugh L G C *Lancet* 1946 ii 553

[1] Tanner N C *Bristol med -chir J* 1948 63 16 *Edinb. med. J* 1951, 58, 201 270

[2] Best, C. H, Taylor N B Physiological Basis of Medical Practice London 1945 p 437

Proof of the usefulness of vitamin E as a prophylactic against coronary thrombosis is still lacking, and, considering especially the high cost of such therapy, I do not know how Dr Shute can substantiate his claim "that there is now very good reason to use it in the treatment of coronary thrombosis, and probably in its prophylaxis"

GUGLIELMO SBARIGIA

Rome.

AN UNEXPECTED PROTEST

SIR,—Forgive my intruding in your terrestial affairs I did not write a glowing book on the vanities of religious experience, but I did write a very good one on its varieties—not quite the same thing. (*Lancet*, Jan 19, p 137, which has just reached me)

Your constant reader,
WILLIAM JAMES

Psychological Department,
Elysian Fields
(No dates here)

HICCUP DURING ANÆSTHESIA

SIR,—Hiccups appearing in the middle of an upper abdominal operation that has been proceeding smoothly under general anæsthesia are a nuisance to both surgeon and anæsthetist, and, especially in these days when abdomens are tamed by curare and similar drugs, are bound to give rise to ironical comment by the surgeon

This hiccuping is a reflex, with impulses ascending via the vagus and/or the sympathetic system and descending through the phrenics; it is caused by undue handling of the stomach and adjacent structures, but is not necessarily associated with too light anæsthesia When the anæsthetic is thiopentone or cyclopropane their slight but definite vagotonic effect seem to enhance the action of manipulative trauma in promoting the reflex

Normal diaphragmatic rhythm is not always restored quickly by giving more anæsthetic or by adding a little carbon dioxide, by intravenous procaine, or by increasing suddenly the concentration of ether

For the last two years we have used in our department a method that has so far given excellent results Up to now we have dealt with 16 cases of hiccup, all during upper abdominal operations (15 for gastric resection and 1 for cholecystectomy) The anæsthetics used were thiopentone for induction and cyclopropane for maintenance, with curare as relaxant

In our cases the usual pattern was one normal inspiration followed by a clonic contraction (hiccup) Regarding these clonic contractions as the result of vagal stimulation we decided to use a sympathomimetic drug—'Methedrine' The patients were not hypertensive, and so 20 mg was given intravenously

As the drug begins to take effect the respirations increase in rate and amplitude, and after a while the pattern of hiccup changes also two inspirations followed by a hiccup, then three inspirations, and so on In less than 3 minutes clonic contractions of the diaphragm disappear and respirations are again rhythmical, with the rate gradually falling to that before the onset of hiccup The plane of anæsthesia, if not deep enough, is then easily corrected

Since this drug has proved so beneficial in hiccup during anæsthesia, we think that it should be tried in those distressing cases where hiccup goes on for days or weeks, resisting all conventional therapy It should be given intravenously and under a light cover of thiopentone to avoid the unpleasant sensations of sudden central stimulation

JOSÉ FAJARDO
Chief Anæsthetist.

Colonial Hospital
Lisbon

RHESUS NOMENCLATURE

SIR,—Recently I was requested to prepare an up to-date report on the medicolegal applications of blood-grouping, and a preliminary draft was submitted to workers in the field While there was no essentia difference of opinion regarding the facts and the practica aspects of the subject, it proved impossible to obta agreement regarding the question of Rh-Hr nomenclatu This experience has proved so illuminating that I thoug a brief account of two of the points of difference wo be of interest

Firstly, objections were raised to the use in the report of the term "conglutination" to describe the reactions in colloid media of Rh antisera which do not clump cells in saline media This objection was based on some trivial difference in the use of the term by certain earlier workers, even though the term has been widely adopted by workers in the Rh field and is unambiguously defined in medical dictionaries Instead of the term "conglutination" one consultant suggested substituting the following expression "methods employing protein-rich menstruums, such as human serum, human or bovine

BRITISH NOTATIONS FOR PHENOTYPE Rh_1rh

Notation	Explanation
(1) None	That is, space for phenotype designation left blank in tables
(2) + + + − or + + − + or C + D + E − c +, &c.	The symbols represent the reactions with the four most frequently used antisera, in various orders
(3) CcDee or CcDe	These designations were proposed in 1949 but have not been widely adopted
(4) $\frac{CDe}{cde}$, CDe/cde, or CDEcde	Most likely genotype
(5) CDe/cde CDe/cDe Cde/cDe	All possible genotypes bracketed together
(6) CDe/cde (R_1r)	Most likely genotype together with "shorthand" or Rh Hr designation for clarity
(7) R_1r	"Shorthand" symbol alone
(8) R_1r R_1R_0 R_0r'	All possible genotypes expressed in "shorthand" symbols, and bracketed together
(9) CDe/c	Symbols d and e omitted in orde to indicate that blood was no tested with anti-e (hr″) serum o hypothetical anti-d (Hr_0)
(10) DCe/dce	Most likely genotype, with symbols arranged to correspond with the postulated arrangement of the "genes" in the chromosome

(1) Collins, J O, Sanger, R., Allen, F H jun, Race, R R. *Brit med J* 1950, i 1927, table I

(2) Race, R R., Sanger, R Blood Groups in Man Oxford, 1950, table XXIX and p 20 Mollison P L, Mourant, A E, Race, R R Rh Blood Groups and their Clinical Effects H.M. Stationery Office, 1948, p 24 Boorman, K E, Dodd, B E, Johnstone A *Brit. J exp Path* 1951, 32, 49

(3) Mourant, A E, Bessis, M. Cited by Race and Sanger (2), table XXIX. Donegani, J A., Ibrahim, K A, Ikin, E W, Mourant, A. E *Heredity*, 1950, 4, 377 Murray J, Taylor, M. *J Obstet Gynæc* 1940, 56, 741

(4) Race R R., Sanger, R Blood Groups in Man table XXXV Mollison, P L, Mourant, A E, Race, R R Rh Blood Grou and their Clinical Effects, tables II and XII Donegani J A., Ibrahim, K A., Ikin, E W, Mourant, A. E. *Heredity*, 1950, 4, 377 Boorman, K E, Dodd, B E, Johnstone, A *Brit J exp Path* 1951, 32, 49

(5) Mollison P L, Mourant, A E, Race, R R. Rh Blood Groups and their Clinical Effects table VI Keynes, G Blood Transfusion Bristol, 1949, table XXV

(6) Race, R R, Sanger, R Blood Groups in Man, tables XXVI, XXVII, and fig 6 Pickles, W M. Hæmolytic Disease of the Newborn Oxford, 1949, table X. This author and others frequently reverse the positions of the symbols Bertinshaw, D, Lawler S D Holt, H A Kirman, B H., Race, R R. *Ann Eugen, Camb* 1950, 15, 234 Collins, J O, Sanger, R. Allen, F H jun., Race, R. R. *Brit med J* 1950, i, 1297

(7) Race, R. R, Sanger, R. Blood Groups in Man, p 93, table XXXII Fisher R A *Ann. Eugen Camb* 1946 13 150 Lawler S D Bertinshaw, D, Sanger R, Race, R R *Ibid*, 1950, 15 258

(8) Race R R, Sanger, R Blood Groups in Man, table LXXXIII (p 254)

(9) Boyd W O Boyd, L G *Amer J phys Anthrop* 1949, 7, 569

(10) Levine, P *Postgrad Med* 1949, 5, 451

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[1] Tropeano L *Progr med Torino* 1948 4 169 439 Prosperi, P Lottini A *Riv Clin pediat* 1949 47 781; *Ibid*, 1951, 49 738

[2] Pollack H Bookman J J Ellenberg M Herzstein J *Amer J med Sci* 1950 219 650

lbumin, or other macromolecular diluents for dilution f the serum with the antibody and for the suspension f red blood cells"—that is, thirty words to do the ork of one. Secondly most consultants objected to he omission of the C-D E notations from the report nd a few even insisted that the C D E equivalents be iven in parentheses behind the Rh Hr symbol each ime such a symbol appeared in the report This was sed on the recommendation of the Advisory Board to he National Institute of Health in the United States, egarding the labelling of Rh antisera even though this 947 report has been rendered obsolete by recent advances n knowledge.

The international Rh Hr nomenclature has been ompletely standardised, and full details are readily vailable in the Rh glossary widely published in several ifferent languages in 1949 and in most recent medical ictionaries This is not so in the case of the British D E notations for which no glossary is available and sage varies widely For example search through recent British periodicals for the C D E equivalent for phenotype Rh_1rh showed more than 10 different methods of esignation in common use, as shown in the accompanying able. Which is to be placed in parentheses after the Rh Hr symbol ?

In the case of the A B O groups and M N S types e have but a single nomenclature. There is no doubt hat the same will eventually come about for the Rh Hr ystem. To argue that time will settle the problem is erely to evade the issue, because the facts are available ow and time settles nothing It is significant that there s no nomenclature problem for the K k types even hough these were found much more recently and our nowledge regarding these types is incomplete In fact, ur knowledge of the A B O groups in certain respects uch as the reactions of anti O sera is not as far advanced s our knowledge of the Rh Hr types

As I have pointed out previously, the only attraction f the C-D E notations is their seeming simplicity ike the Moss-Jansky numberings they conceal lack of nderstanding and discourage any desire to acquire uch an understanding If workers would make a sincere ffort to learn and digest the facts, there would be no omenclature problem for the Rh Hr types

Brooklyn, New York,
U.S.A

A S WIENER

EFFECTS OF BLACKCURRANT SYRUP IN SCHOOL-CHILDREN AND MANUAL WORKERS

SIR,—A search of the published work has revealed a paucity of data on the effects of long continued dosage with a vitamin C preparation and it is hoped, therefore to publish our findings in detail later; some of them, however seem worth reporting at this stage

A nutritional survey was carried out in the Royal Forest of Dean between March 1949 and May 1950 on 208 boys and girls attending two schools, 201 men and women working in two factories, and 132 coal face miners at a colliery On every school-day or working day for 1[illegible] months, half of each group received blackcurrant syrup supplying 40 mg of vitamin C, and the other half a synthetic syrup containing no vitamin C Before and after the period of administration the subjects vitamin-C saturations and hæmoglobin levels were measured and their histories of respiratory infection skin conditions (dermatitis and furunculosis) and dyspepsia were taken In addition height, weight and amount of dental caries were recorded in the children, and dark adaptation was measured in about a third of the miners.

Between the spring of 1949 and of 1950 both children and adults in the control groups showed a significant deterioration in vitamin C saturation probably as a result of the removal of price control of fruit and a local scarcity of vegetables Inquiry revealed that the consumption of vegetables and of such fruits as oranges had decreased during the period of the survey

The administration of the blackcurrant syrup produced significant improvements in two respects The first, an improvement in vitamin-C saturation was expected though it was surprising to find that as many as 7% of the adults taking the blackcurrant syrup still remained highly unsaturated after a year's supplementation The second improvement was more striking This was a significant decrease in clinical symptoms in the men and women at one of the factories. It is partibularly interesting that this group was characterised at the beginning of the survey by a low level of hæmoglobin and a low degree of vitamin C saturation

We are grateful to H. W Carter & Co Ltd. for financing this survey and for providing the standard 'Ribena' blackcurrant syrup

VERNON L S CHARLEY
Coleford, Glos.　PAMELA MUMFORD

King's College of Household
and Social Science
University of London.　JOHN YUDKIN

Parliament

National Economies

IN the House of Commons last Tuesday, Mr R A BUTLER the Chancellor of the Exchequer, announced new proposals for overcoming this country's economic crisis. The total cost of the National Health Service is to be kept within its present ceiling of £400 million, and the general structure of the service is to be preserved but charges are to be made for prescriptions, dental treatment and for such appliances as surgical belts and boots, hearing-aids, and wigs; and the charge for amenity beds is to be increased The charge for prescriptions will be 1s which is expected to yield £12 million per annum, but relief will be given where this charge would entail hardship In the dental service the charge will be £1 or the full cost—whichever is the less—for all dental treatment except the supply of dentures where a charge is already made These charges will not apply to children or to expectant or nursing mothers

Mr Butler explained that imports would have to be cut by a further £150 million making a total reduction with the steps announced last November of £500 million If import prices increased rations might have to be reduced As it was there would be considerable reductions in a great number of foodstuffs which supplemented rations including canned meats, hams, fish fruit, and vegetables, and fresh fruit. The basic food rations must be kept up if possible The reduced allocation of sugar, oils and fats announced last November, would mean fewer cakes and less confectionery in the shops

The period of school attendance would not be changed, and it was not intended to discharge, or cease recruiting, teachers. The strength of the Civil Service was to be reduced by 10 000, thus saving £5 million per annum Other savings were to include a reduction of £22 million in tobacco imports, and reduction of the foreign travelling allowance from £50 to £25 More steel was to be diverted to the manufacture of goods for export and the motor industry would be asked to release to the home market this year only 60 000 cars and 60 000 commercial vehicles. The Government intended to carry out its pledge on housing which used comparatively little steel The amount of building this year should be considerably greater than last year and probably greater than in 1950

Mr Butler declared that if every part of the Commonwealth did its bit, a deficit of £1450 million in the second half of 1951 would be reduced to zero in the second half of 1952 The purpose of everything I have to propose is to enable this country to pay its way In the last six months of 1951 the United Kingdom had a deficit with the non-sterling world of £575 million; in the last six months of 1952 we must reduce this by £475 million to £100 million and in the same period we must have a surplus of at least £100 million with the rest of the sterling area

Mr Butler said that Budget Day is to be March 4

Obituary

ARTHUR GASKELL

K C B , O.B.E , F.R C.S

Sir Arthur Gaskell, who died on Jan. 12, served in the Royal Navy for 37 years and was medical director-general from 1927 to 1931

He was born at Dartmouth in 1871 and qualified in 1892 from University College Hospital He entered the Royal Navy as a surgeon the following year, and he took the F.R C S in 1899 He had charge of the surgical section of the advanced base hospital at Leu-Kung-Tao in the Boxer rebellion in 1900 His good work there was recognised by his special promotion to staff surgeon in 1902 He took a keen interest in physical training and in the teaching of first-aid, and while on the Cape Station he had a booklet on first-aid printed and distributed at his own expense In 1911 at Admiralty request he wrote a primer for use in health lectures and ambulance-training which became the official textbook on first-aid in the Royal Navy In 1906 he was promoted to fleet surgeon. Six years later he became the first director of medical studies and professor of hygiene at the new medical school organised at the Royal Naval College, Greenwich

At the outbreak of war in 1914 he was responsible for fitting out the hospital ship *Soudan*, and in September he became the principal medical officer of the Royal Naval Division He served with the medical unit in the Expeditionary Force, and he was in charge of the medical unit in Gallipoli He was mentioned in despatches and given the C B for these services From 1916 to 1919 he was in charge of the Royal Naval Hospital at Cape of Good Hope and he was appointed O B.E while in that post After the war he served at R.N Hospital at Chatham till 1923 when he was appointed medical officer-in-charge of R N Hospital, Plymouth In 1927 he became the medical director-general of the Navy, and he was appointed as honorary surgeon to the King in 1928 and made a K C B in 1930 After his retirement in 1931 with the rank of surgeon vice-admiral he served on the Committee on the Medical Branches of the Fighting Services under the chairmanship of Sir Warren Fisher He was a fellow of University College, London

In 1911 he married Sophie, daughter of Sir Lewis Michell, who survives him with a son and daughter His elder son was killed in action in 1944

HENRY EDMUND SÝMES-THOMPSON

M.A , M.D Camb , M R.C P

Dr H E Symes-Thompson, consulting physician to the Royal Chest Hospital, London, died at Oxford on Jan 18 He came of a distinguished medical family, and his father Edmund Symes-Thompson, F R.C P , was physician to the Brompton Hospital at the beginning of this century

He was educated at Winchester and at Christ's College, Cambridge, where Jan Smuts was his contemporary and friend He played cricket for the university, narrowly missing his blue, and later he was nearly always to be seen at the Varsity match at Lord's He qualified from St. George's Hospital in 1900 and held house-appointments at St George's, at Westminster, and at the Brompton Having taken his M D and M.R C.P in 1903, he was appointed physician to the Royal Chest Hospital in the following year He also joined the staff of the Royal National Hospital for Consumption at Ventnor, and the Royal Northern Hospital in London. For many years he was physician to the Society for the Propagation of the Gospel and to the Artists' Annuity and Benevolent Funds

As a physician he was extremely methodical and careful in the investigation and treatment of his patients, and C F recalls the following example of the care he gave "a patient, who was a distant relative, was operated on for acute appendicitis and later developed a chest infection Symes Thompson, who had been called in consultation, had to leave London for a night, and while away he sent three telegrams advising treatment in the event of complications arising"

He quickly earned a reputation in

M O H , a friend from Winchester and Cambridge days, writes "Symes-Thompson was an expert diagnostician in the early stages of pulmonary tuberculosis at a time when X rays had scarcely come into general use As a practitioner I remember particularly his kindness and consideration towards his patients, and how by his simple explanation he made the disease less alarming to them As a friend he was devoted and never failed to be amusing Though he seemed to live in a private world largely devoted to the Bible, classics, and cricket, he was always liable to emerge to comment on everyday affairs with some apt and appropriate quotation" Though somewhat reserved, he made a good companion and was an excellent conversationalist

For some years Dr Symes-Thompson had been living in retirement in Buckinghamshire, rarely coming to London His widow, formerly Miss Caroline Tacon, survives him with a son and a daughter In 1941 his elder son, who had also qualified at St. George's, was killed by a bomb while on duty at a London hospital

JOHN ALLEN SPOTTISWOODE PURVIS

M.B Belf

Dr J A. S Purvis, anæsthetist to the National Temperance Hospital and the Samaritan Hospital for Women, London, died on Jan 19 at the age of 53

Son of an officer in the Royal Engineers, he himself passed from The Shop into the Royal Artillery after his schooling at Rugby During the first world war he served in France, and he was seriously wounded in 1918 in the German attack in Champagne, to which "quiet" sector his division had been sent after their ordeal in the March battles The loss of most of his right lower limb brought his military career to an end, and he decided to study medicine He obtained the M B degree at Queen's University, Belfast, in 1925

He early chose anæsthetics as his specialty, and returning to London he became in due course anæsthetist to the Samaritan Hospital for Women, the National Temperance Hospital, the West End Hospital for Nervous Diseases, and the Western Ophthalmic Hospital

R A K writes "Those who had his help in their work will miss the care, skill, and good judgment which he brought to his duties, his consideration for his patients, and the feeling of support and coöperation which he gave to the surgeons He made up for the loss of his leg by his interest in his garden at his riverside home and in his car, which it was his pleasure to servic himself It was also his pleasure to entertain his friends on the river, generously when entertainment was possible, and very adequately even in the lean years His kindly, steadfast, and generous personality will be sadly missed, perhaps not least by hospital residents, to some of the less reverent of whom he was known as Uncle John, and so called to his face by a few"

He leaves a widow

Births, Marriages, and Deaths

BIRTHS

BREARLEY.—On Jan 20, the wife of Dr B F Brearley, of Woodplumpton Preston—a daughter

DEARLOVE.—On Jan 23, the wife of Dr Arthur Dearlove, o Beaminster—a son

EVANS.—On Jan. 14, at New Cross, the wife of Dr C J Eva —a daughter

GUPTA.—On Jan 18, in London the wife of Dr H C Gup —a son

HALPER.—On Jan 10, the wife of Dr Howard Halper, of Lond and Melbourne—a daughter

JEPSON.—On Jan 16, the wife of Dr Frank Jepson, of Invercargill, New Zealand—a son

MACDOUGALL.—On Jan 26 in London the wife of Dr Iain MacDougall—a son

SKEGGS.—On Jan 23, at Winchester, the wife of Dr P L Skeggs —a son

WEBB.—On Jan. 23, at Newcastle the wife of Dr John Webb —a son

DEATHS

CRAWFORD.—On Jan. 22, in London Hugh Gregan Crawford, O B.E M C M.R.C.S of Cannock Wood, Rugeley

SINGER.—On Jan 20, at Sutton Surrey Hugh George Singe M R.C.S , aged 38

Notes and News

TRAINING OF MIDWIVES

WHATEVER may be the obstetric advantages of confinement in hospital the decline in the proportion of babies delivered in the home is certainly having a bad effect on the training of midwives The latest report from the Central Midwives Board[1] describes how the shortage of domiciliary cases is making it harder and harder to secure new districts for training purposes and to maintain the output of midwives At least three months district training during which a pupil must conduct a minimum of ten deliveries, are prescribed by the regulations, and the board is reluctant to reduce those requirements.

In their report on the board's work Mr Arnold Walker F.R.C.O.G., the chairman, and Mr R. J Fenney the secretary suggest that the situation would improve if the responsibility of paying for the district part of a midwife's training were more clearly defined. At present there is no nationally agreed formula; sometimes it is the hospital authority that pays and sometimes the local authority And local authorities, not appreciating the fact that their contribution to the training of pupil midwives is essential may take a short view and fail to make their districts available for training purposes. Clearly it would be much easier to maintain a satisfactory training system if a common method of payment could be agreed on, and the matter is under discussion between the Ministry of Health and the local-authority associations

RHEUMATISM

As in previous years, the annual report from the department of rheumatic diseases of the West London Hospital is far more than a report; it contains several short papers by members of the staff and abstracts of lectures delivered by distinguished visitors to the department The emphasis is naturally on cortisone and A.C.T.H and the Festival lectures on the use of these preparations in rheumatic diseases, given last summer at the Royal Society of Medicine by the physician in charge of the department, Dr W S C Copeman, and his assistant Dr Oswald Savage, are reproduced. Some interesting case reports by Dr J H H Glyn include one in which a diabetes induced with A.C.T.H. has persisted for 11 months. A preliminary note by Dr A. uelakhoff and Dr Rosemary Davies on 5 cases of rheumatoid arthritis treated with nitrogen mustard does not describe such good results as those reported in other countries. The lecture by Dr C. H. Slocumb of the Mayo Clinic, was about a series of 100 cases of rheumatoid arthritis in which cortisone was given by mouth; doses only slightly larger than those required by injection were effective in all but 1 case, and only patients had any gastro-intestinal irritation.

WANTED: A PORTRAIT OF SILVESTER

Dr Peter Karpovich professor of physiology at Springfield College Springfield, Mass., is writing a book on artificial respiration. He would like to include a picture of Dr Henry Robert Silvester the originator of the Silvester method of artificial respiration. He has made an exhaustive but unsuccessful search and he would be grateful if anyone who knows of such a picture would get in touch with him.

STERILISER FOR CHEATLE'S FORCEPS

BACTERIOLOGISTS have often pointed to inadequate sterilisation of Cheatle's forceps as a source of infection in operating theatres. Messrs. Runners Products (11 Suffolk Street, London, S W 1) have accordingly produced an electric simmering steriliser in which the instruments can be kept without the handles becoming hot. The loss of water by evaporation is low and it is claimed that there is no escape of visible steam. The cost is 12 guineas.

Physicians to the King

Air Commodore F E Lipscomb has been appointed an honorary physician to the King in succession to Air Commodore C. T O'Neill, and Air Commodore R. H. Stanbridge in succession to Air Commodore Abraham Briscoe

University of Cambridge

Mr B H. C Matthews, SC.D F.R.S has been appointed to the chair of physiology in succession to Prof E D Adrian, O M F.R.S

University of St Andrews

Dr Earl R Loew professor of physiology in the Boston University School of Medicine, has been appointed visiting lecturer for 1952 within the faculty of medicine of the university Professor Loew will hold his lectureship in the department of pharmacology and therapeutics of the Medical School, Dundee during September

National University of Ireland

The honorary degree of D.LITT is to be conferred on Mr William Doolin, F.R.C.S.I.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Jan 26 with Dame Hilda Lloyd the president, in the chair, the following were elected to the fellowship:

Yeshwant Narayen Ajinkya A. W Andison, Alice J M. T Barnes, C W. F Burnett, W D A. Callam G P. Charlewood Samuel Davidson Richard de Soldenhoff A B Evans D B Fraser H F P Grafton, C G Lennon, W A. Liston, Ruvin Lyons, Hugh McLaren R F Matters B E Meek, H K Porter P G Preston, D C Racker G W Robson, J W. Schabort, G G L. Stening S L Townsend, J C Whyte R J Wotherspoon.

N McA Gregg was also elected to the fellowship in recognition of his work on rubella in pregnancy

Lydia Colaco was admitted to the membership

The following were elected to the membership:

E. McL Barbour Caroline D Baugh R. M. C. G Board D C G Bracken, A D H Browne K. McL Crocker Victor Dromo M P Durham James Elstub Bruce Eton M R. Fell Hugh Ferguson, W T Fullerton, R L. Gadd F. G Geldenhuys A I I Klopper J B Lawson Sarah Lehane R. D Macbeth A D McIntosh, Declan Magner D J Meagher A. P B Mitchell Nathan Moss, T. R Nelson, F P D O'Neill, C B. Oxner, John Price, Monica M A. Reford W H D Scotland H I Schmilg R. S L. Stafford Joan E. Storey, Ewen Sussman J S Tomkinson F L A Vernon Joseph Ward P P Wium.

The Sims-Black travelling professor Mr G F Gibberd left for South Africa on Jan. 31 on the first stage of his tour

Guy's Hospital Dental School

The annual clinical meeting of the school will be held in the dental department of Guy's Hospital, London, S.E 1, on Saturday March 1

North of England Obstetrical and Gynæcological Society

The following officers have been elected for 1952: president, Mr P Malpas; treasurer Dr C H Walsh general secretary, Dr T E Lennon; and reporting secretary, Mr S Benders

Course on Rheumatism

A course on the Chronic Rheumatic Diseases will be held at the rheumatism unit of St. Stephen's Hospital on Saturday and Sunday March 29 and 30 Sir Adolphe Abrahams will give the opening lecture on the Rheumatic Diseases in Relation to General Medicine and other speakers will include: Dr Francis Bach Dr Grace Batten Dr Raymond Daley Dr Philip Ellman, Mr Timbrell Fisher Prof Charles Gray Dr Dudley Hart and Dr A. G Signy

Conference of the International Union against Tuberculosis

The 12th conference of the union will be held at Rio de Janeiro under the presidency of Prof Manoel de Abreu from Aug 24 to 27 Prof. Arvid Wallgren (Sweden) will open a discussion on Immunity and Tuberculosis, Dr J Burns Amberson (U.S.A.) on Minimal Pulmonary Tuberculosis and Dr Fernando Gomez (Uruguay) on Mass Surveys. Further particulars may be had from the NAPT Tavistock House North, London, W C 1

Lord Woolton at the National Institute for Medical Research

Lord Woolton the Lord President of the Council visited the National Institute for Medical Research at Mill Hill on Jan. 25 accompanied by the Earl of Limerick who has recently been appointed chairman of the Medical Research Council Lord Woolton met senior members of the scientific staff of the institute and was conducted on a tour of the laboratories by the secretary of the Medical Research Council and the director of the institute.

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[1] Report on the Work of the Central Midwives Board for the Year Ended March 31 1951 Published for the Board by Spottiswoode Ballantyne & Co. Ltd 1 New Street Square London, E.C.4 1951

Meeting of International Diabetes Federation

Further particulars about this meeting, which is to be held at Leyden, Holland, during the second week of July, may be had from Dr R D Lawrence, 149, Harley Street, London, W 1.

The Mentally Handicapped in the Community

The National Association for Mental Health will discuss this subject at their annual conference at Bedford College, Regent's Park, London, N W 1, from March 27 to 29 Further particulars may be had from the conference secretary of the association, 39, Queen Anne Street, London, W 1.

Proportion of Patients

Last year about 1 in 10 people in the Scottish Western Regional Hospital Board area were treated as inpatients, and 1 in 3 as outpatients Dr A. K. Bowman, the senior administrative medical officer of the board, who gave the figures at a meeting in Glasgow on Jan. 22, said the number of unstaffed beds had been reduced by 1621 since 1948, and now stood at 2622

Medical Films

The medical committee of the Scientific Film Association are to show the following films at Westminster Hospital medical school on Feb 13, at 5 P.M *Cardiac Output in Man*, and *Blood Cells*

St Thomas's Hospital Musical Society

On Thursday, Feb 7, at 8 15 P M, at St Sepulchre's Church, Holborn Viaduct, London, E C 1, this society will perform works by Haydn, Schutz, Gottfried Wagner, Vaughan Williams, and Holst, conducted by Dr W Dykes Bower, and the Benedicite from *Nebuchadnezzar* by Dyson, conducted by the composer.

Doctors' Hobbies

If there are enough exhibitors an exhibition of doctors' hobbies will be held again during the forthcoming meeting of the British Medical Association and Irish Medical Association in Dublin. Paintings, drawings, literature, practical handwork, and collections from stamps to silver and glassware will be welcome Further particulars may be had from Dr F S Bourke, 14, Fitzwilliam Square, Dublin

Meeting of W H O. Executive Board

At the opening of this board's 9th session, in Geneva on Jan. 21, Prof Jacques Parisot (France), the chairman, spoke of the difficulty of recruiting competent experts for the technical assistance programmes. He suggested that all member States should be asked to coöperate in the selection of experts, who should be specially trained in regions differing from their own Professor Parisot pointed out that three of the W.H O regional committees—those for South-east Asia, the Western Pacific, and Africa—had been very insistent on the need for larger supplies of medical and other equipment for technical assistance projects "This extremely complex problem," Professor Parisot declared, "appears to go beyond the powers of the World Health Organisation and affects the whole conception of technical assistance"

Raising Funds for Hospitals

At the annual meeting of the National League of Hospital Friends on Jan 22 Mr Harry Crookshank, the Minister of Health, said that in future members of hospital boards and committees would be free to take part in the work of hospital leagues or similar groups "The financial basis of the hospital service," he said, "is now so generally known that the danger of misunderstanding has passed I am therefore informing hospital authorities that I see no objection if in future members of hospital authorities—but not salaried officers—take part in the organisation and activities of Leagues of Friends or similar voluntary bodies, including appeals for funds But it is still my view that neither members nor officers should take part in actual appeals in their official capacity While there is no objection to voluntary bodies meeting from time to time in hospital premises, appeals should be organised from outside On special occasions—e g, at Christmas—there may be no objection to a collecting box for some special purpose but in general I am sure it is best not to try and raise money from patients or their friends on hospital premises"

EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1165 The proportion admitted was 85 4%

Diary of the Week

FEB. 3 TO 9

Tuesday, 5th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P M Mr A R. Clarke Prevention of Shock and in Trauma.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene, Keppel Street Dr Alice M Stewart Methods of Research in Medicine

INSTITUTE OF DERMATOLOGY, St John's Hospital, Lisle W C 2
5 30 P.M Dr C A. Keele Sweat.

WEST END HOSPITAL FOR NERVOUS DISEASES, 40, Lane, W 1
5 30 P M Mr G C Knight Intracranial Abscess.

Wednesday, 6th

UNIVERSITY OF OXFORD
5 P M. (Radcliffe Infirmary) Prof. John Morley Tumours of the Pancreas (Litchfield lecture.)

INSTITUTE OF DERMATOLOGY
5 30 P M Dr R. W Riddell. Coccidioidomycosis.

MANCHESTER MEDICAL SOCIETY
4 30 P M. (Medical School.) *Section of Medicine*. Dr Greenberg Treatment of Tuberculosis from the Practitioner's Angle

MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8 30 P.M (Royal College of Surgeons, 18, Edinburgh) Dr C F Rolland, Dr J D. Dr T W G Kinnear Addison's *Disease*

Thursday, 7th

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr A H. Hunt Surgical Treatment of Banti's drome (Hunterian lecture)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene) Prof. J M. Contributions in the Twentieth Century to the of Health

INSTITUTE OF DERMATOLOGY
5 30 P M *Dr J O Oliver* Reticuloses in relation to tology.

INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Ormond Street, W C.1
5 0 P M Prof. Ian Aird Abdominal Surgery in C

ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner,
4.30 P.M Dr D J Williams Neurology

MANCHESTER MEDICAL SOCIETY
8 15 P.M (Staff House, University of Manchester) *Anaesthetics* Short papers

UNIVERSITY OF ST ANDREWS
5 P M (Medical School Small's Wynd, Dundee) Prof. Cappell Blood Groups and their *Clinical*

HARVEIAN SOCIETY OF LONDON, 11 Chandos Street, W 1
8 15 P M Mr P H Newman, Mr Leslie Williams Low

Friday, 8th

INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF C
5 30 P M (London School of Hygiene) Mr T Holmes Surgical Treatment of Cyanotic Congenital

INSTITUTE OF DERMATOLOGY
5 30 P M. Dr R M. B MacKenna Developmental malities

OSLER CLUB
7 45 P.M (Royal College of Surgeons) Dr W N Hippocrates in Ancient and Modern Times. Mr Chadwick On Translating Hippocrates Mr Leon Amputations—Hippocrates and Modern Times Dr D Webster Hippocrates and Periodicity in Lif Disease

Saturday, 9th

S E METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY
10 30 A M (Kettlewell Hospital, Swanley, Kent.) Dr Forgacs Pulmonary Circulation in Lung Disease

Appointments

EVANS, JOHN M.D Camb F R C.S E consultant E N T Blackburn hospital centre

MASLOWSKI, H A M.D Polish School of Medicine, F.R.C consultant neurosurgeon, Salford Royal and C

Appointed Factory Doctors:

FLINT K N, M.B Edin, D P H. Alfreton district.
LOVERING, C J, M R.C.S Manchester East
MACCOWAN, D A., M.B Glasg. Snodland district, Kent.
MAURICE J B., M R.C S Marlborough district, Wiltshire.
SHARPLEY, J E., B.M Oxfd Burford district, Oxfordshire.
WATSON, F G H., M R.C.S Salisbury district, Wiltshire.
WHITE, H D M.B Lond Berkhamsted district.

The Terms and Conditions of Service of Hospital Dental Staff apply to all N.H.S hospital posts we advertise, otherwise stated Canvassing disqualifies, but candidates may visit the hospital by appointment

PAIN IN THE BREAST *

H J B Atkins
D.M., M.Ch Oxfd F R C.S
IRECTOR, DEPARTMENT OF SURGERY GUY S HOSPITAL, LONDON

ohn Hilton wrote : " Every pain has its destined and quent signification if we will but carefully search for pain the monitor is a starting point for contemplation ich should ever be present to the mind of the surgeon his reference to treatment

ain is difficult to define ; and the authors of standard tionaries, although they know well enough what pain is like, have to employ close synonyms to describe it vertheless, pain has certain qualities which help to der our conception of it somewhat less obscure even t cannot be precisely defined

ain, unlike all other types of sensation, is always pleasant, and unhappily pain sensations never fatigue. rthermore pain is unique in that many forms of rgy constitute the adequate stimulus it may be ited by electrical chemical, or mechanical stimuli d by extremes of heat and cold perhaps as Sherring n (1906) pointed out, the only common factor in these muli when they become effective in producing pain that they threaten to damage tissue Pain sense, refore unlike other sensations, tends to be primarily otective rather than informative or ' gnostic" hence hn Hilton s phrase—" pain the monitor "

ANATOMY OF PAIN

Various types of sensory receptor mediate a variety special sensations : temperature sensations greater an that of body temperature or " heat temperature nsations less than that of body temperature, or " cold "; essure position sense and so on Krause's end lbs, Meissner s corpuscles, Merkel s discs, and Golgi azzoni endings are each modified by Nature for a definite nction, and the exquisite beauty of these modifi tions must be a source of endless delight and stimulus the neurohistologist. For years it was undecided hether these nerve-endings also transmitted the impulses pain It was freely canvassed that pain was due ly to excessive stimulation of these nerve-endings ; d it was not until von Frey (1896) showed that certain eas of the body sensitive in the extreme to painful muli—namely the teeth the tympanic membrane and e central zone of the cornea—did not contain these dings, that the necessity for a specific pain ending was cognised.

The receptor identified in these areas, sensitive only to in could not have been more simple—it was a free rve-ending In these areas the axis cylinder divides nd looses first its medullary sheath then its neurilemma nd finally the naked branches of the axis-cylinders mify freely in the tissues. Such an arrangement is ound everywhere in tissues sensitive to pain That is ot to say that the more particularised nerve endings may not subserve pain as well and indeed in the case specially of Meissner s corpuscles, and to a lesser extent of Krause s end bulbs and Ruffini s endings, there are mall unmedullated fibres, distinct from the medullated ibres appropriate to the specific sensation which may arry pain impulses. Where a lesion in the breast is ainful it must have these naked nerve-endings within it or in close relation to it

The painful sensations picked up by the sensitive erve-endings are flashed to the spinal cord ; some of these mpulses travel relatively slowly, while others travel at express speed In the spinal cord there is an ' all change" at the synaptic junctions in the posterior horn ; and from here taking leave of their erstwhile travelling companions—touch position sense and their small relations—the pain fibres cross the track in the bridge of the anterior commissure and travel up the main line, or lateral spinothalamic tract, to the thalamus. What happens to them there is still somewhat uncertain Following the teaching of Head (1920), some assert that they emerge into consciousness at this primitive level—a primeval sensation requiring but a simple primitive interpretation Others maintain that, before appreciation they are further relayed to the sensory cortex However this may be, these processes are now something more than a complicated physicochemical reaction they acquire ' affective tone, ' as the physiologist would say ; they are interpreted as a sensation they become *pain*

PHYSIOLOGY

Turning from anatomical to physiological considerations, we must inquire about the precise effect produced at the nerve-endings by these various stimuli—physical chemical, and mechanical—which start pain Adrian (1950) holds that the common effective incident is a sudden increase in permeability of the surface membrane of the naked axis-cylinder He believes that this surface, for some distance before the end of the nerve, is readily broken by mechanical distortion Chemical agencies electrical excitation and extremes of heat and cold can easily produce pain by simple mechanical distortion of the nerve-endings but some of these agencies can operate for the most part only on the skin

Possibly the source of muscle pain—that is, the agency which renders the surface of the naked axis-cylinders suddenly more permeable—is most often chemical Cramp in the calf in cases of intermittent claudication, or in the heart-muscle in cases of cardiac ischæmia, is probably engendered by the excess of metabolites which the inefficient circulation fails to clear The particular metabolite responsible for the pain has been termed by Lewis (1942) the ' pain substance." Intestinal, gall bladder renal, and uterine colic are engendered by the same metabolic products elaborated in excess by the excessive action of muscles in the walls of these viscera when they seek to rid themselves of their contents

With regard to painful diseases of the breast, however we find it difficult to believe that thermal electrical or gross mechanical agencies usually account for the pain Metabolically the breast is relatively inert ; and the pain substance of Lewis, whatever that may be is not so easily imagined in these more placid environs as it is in the metabolic stir of contracting muscle By a process of exclusion we are led to conclude that the most probable stimulus evoking pain in the breast is mechanical distortion. The rapidly increasing tension and vascular engorgement of an abscess, throbbing with each beat of the pulse (that is reaching a maximum intensity with each periodic increase in local tissue tension) suggests that mechanical tension is the pre eminent factor Again in fibroadenosis it seems probable that the interplay of contracting fibroblasts with the naked nerve-endings accounts for the distortion and rupture of the surface membrane of these nerve-endings and so for the pain With as it were the worst will in the world it is difficult to produce violent distortions of tissue within the breast substance, because this is relatively lax and accommodates itself comfortably to internal stresses. It is therefore unlikely that the agonising quality that stigmatises pain from a tooth or from a finger pulp ever affects the breast

ABSCESS

Breast abscess occurs as a result of local suppuration in an area of acute mastitis. It is almost invariably due to *Staphylococcus aureus* and affects particularly secreting ducts, the orifices of which are obstructed by inspissated debris There is no doubt that organisms are normally present in the ducts in the lactating breast They may of course reach these ducts by the blood-stream, but it is more probable that they make their way up from the orifices at the nipple The evidence for this view is firstly that when there is a crack at the nipple the ducts may be swarming with organisms, and secondly that staphylococcal infections of the breast sometimes assume almost epidemic proportions in maternity wards, when it would seem likely that the causative organism is conveyed from breast to breast by carriers. Such an invasion of the ducts with organisms may have no effect, the organisms may simply be washed away at the next feed like flotsam on a tideway If, however, the duct becomes blocked, as is likely to happen in the first weeks of lactation when epithelial elements tend to choke it, and especially if a cracked nipple discourages the mother from giving this breast fully, then the obstructed duct, like any other obstructed viscus, becomes a *locus minoris resistentiæ* and the organisms breach the now dilapidated defences

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* An address delivered to York Medical Society on Dec 1 1951

These pathological processes each have their clinical counterpart the cracked nipple, the subsequent flush and tenderness of the obstructed duct, the hectic fever of the defences making their stand, and finally the œdema indicating that pus under tension is obstructing the lymphatic drainage from an area of overlying skin Nowadays all but the last of these phases is usually reversible The exhibition of penicillin in time and in sufficient amounts will usually abort staphylococcal cellulitis during lactation Unfortunately, however, about 5% of strains of staphylococcus are insensitive to penicillin, and the percentage is likely to increase Perhaps chloramphenicol or 'Aureomycin' or some still undiscovered drug will prove as effective as penicillin without stimulating the development of resistant strains As soon as œdema appears the pus must be allowed to escape If fluctuation is awaited, then before the pus reaches the surface it will have ramified in the breast tissue, seeping between the fibrous septa to create that extensive loculated cavity which is so difficult to drain and which leaves the breast a scarred relic

Some, from an emotional distaste for the idea of an operation, or more rarely in a justifiable attempt to substitute something better, have preferred to insert a needle into these collections, aspirate their contents, and replace the pus with penicillin solution I was once one of these, but concluded that the experiment, whether without penicillin (Atkins 1938) or with penicillin, was a failure I need not recapitulate the disappointments, frustrations, and needless (I had better have said "needlesome") pain which these women suffered compared to those who are treated according to the standard principles recognised by John Hilton

The best—easily the best, and perhaps the only—way to treat a breast abscess is to make a radial incision as soon as the overlying skin becomes œdematous The incision need be no longer than is required to insert the index finger, which then breaks down the adhesions, and a small soft drain is inserted into what should at this stage be a relatively small and simple cavity Parenteral penicillin is prescribed to exorcise the surrounding cellulitis and in nineteen cases out of twenty the abscess heals without more suffering to the patient than is occasioned by introducing thiopentone into a vein In the treatment of diseases of the breast the hollow needle, whether to aspirate abscesses, to puncture cysts, or in cases of suspected carcinoma to perform what is termed a "drill biopsy," had better be left to those who have a particular skill, a peculiar disposition, or a poverty stricken comprehension

With the drainage of an abscess the tissue is at on relieved and the pain is gone We may picture the crumpled pain nerve-endings straightening themselves out with a sigh of relief, their surfaces restored and refreshed, and standing ready once more to give warning of the approach of some other tissue-destroying force.

CHRONIC INFLAMMATION

Chronic inflammation in general is chronic either because of the enfeebled influence of some otherwi virulent invader or because the invader itself, as i tuberculosis or syphilis, is insidious rather than bold. In either event the tissue reaction has much in comm with that engendered by acute inflammation, but is l in degree, and so it is with the symptom of pain T main symptom of the tuberculous breast or the chron pyogenic abscess is an ache rather than a pain If w are to attribute to our pain nerve-endings an "all-o none law," we must assume that this lesser tribulat is caused by fewer endings being caught up in the slow processes of distortion now operating The majori accommodate and escape, only the few become twist and so disturbed that the integrity of their surfac membrane is impaired

FIBROADENOSIS

It is when we come to that nodular painful conditio of the breast which is so common in women between th ages of 30 and 50 and to which we give the name "fibr adenosis," that the genesis of the pain assumes greatest interest and becomes of considerable practic importance

This pain has certain qualities which may serve betray its nature In the first place it is often mo severe a week to ten days before the menstrual per and tends to diminish as soon as the period is well und way We know from microscopic section of the norm breast at different phases in the menstrual cycle that the premenstrual phase there is œdema of the su epithelial fibrous tissue, the whole breast tends become engorged and sensitive so that many wom can tell precisely when their periods are going to st This observation in itself favours a histomechan explanation for the pain

The pain of fibroadenosis has a further and mo bizarre feature it often varies with the weather— observation first recorded, so far as I know, by Ast Cooper (1820) This quality is shared by the pain due "fibrositis," "rheumatism," and osteo-arthritis, to household expressions It cannot be that this effect due to variations in temperature, because presuma the temperature at the site of genesis of the pain practically constant, nor can it be due to the humidity It is possible that atmospheric pressure may play a par and that the cells responsible for the effect on the pain endings are sensitive in some way to this pressure but to speculate along these lines would carry feet too far from the ground. Nevertheless, beca we cannot explain a fact this is no good reason ignoring it

Is there anything, then, in common between apparently dissimilar disorders as fibroadenosis and fibrositis? Their names afford a clue Both disorders together with those other distempers associated wi what we may term "barometric pain," are characteris at some stage in their evolution by intense fibro blastic activity In a section from the breast of a patient with fibroadenosis associated with much pain, the field is usually swarming with active fibroblasts Many years later when the disease is no more than an uncomfortable reminder to the patient to attend for periodic investi gation, most of the fibroblasts have passed through the stage of fibrocytes and completed their natural life-cycle to form inert collagen fibrils Later still, when the ease has become completely symptomless, the whole d is composed of inert collagen fibrils

It is not unlikely therefore, that the pain in fibro enosis is associated with this fibrosis We know that roblasts are lively, writhing things with considerable wers of contractility Over the years they may ntrive to reduce the length of the lesser curvature of e stomach from six inches to an inch in their incessant deavour to throttle a peptic ulcer Can we not picture erefore the considerable mechanical activity which ust take place on a microscopic scale when these fibro asts are at their most active stage early in their careers ? is probable that the distortion produced by fibroblasts the trigger which fires off the impulses up the pain nducting nerves.

As to the degree of this pain, I have an idea that this never very severe, although it may be interpreted severe through fear of its significance Everyday ervation convinces us that the mental state exerts profound effect on appreciation of pain Fatigue nger guilt, and fear—particularly fear—enlarge this nsation so that a feeling becomes an ache' an ache "pain," and a pain an 'agony" In fibroadenosis e patient's real symptom is fear and pain is subsidiary follows, theoretically speaking that the best treatment the pain is reassurance, and in practice reassurance llowing a conscientious examination, coupled perhaps th a placebo such as short-wave diathermy or infra red ys, proves far the most potent therapeutic weapon fact if reassurance does not succeed nothing else will moval of the breast for this symptom is a most rewarding exercise, the pain then being noticed in the est wall or elsewhere

Two of the worst cases of pain in the breast that I ave encountered illustrate this point.

The first, which I have related elsewhere (Atkins 1950) as of a hospital nurse who in 1937 persuaded me to remove oth her breasts which she said were agonising Of some alf-dozen patients operated on for this symptom she was e only one in whom this treatment seemed to have been least temporarily successful but in 1948 she returned to ospital with a perfect history of gall-stone colic, including t "a touch of jaundice with each attack. Despite a rmal cholecystogram I foolishly removed what turned out be a perfectly normal gall bladder

The other instance was of an American woman whose tory of breast suffering was harrowing in the extreme; o tender were these organs on palpation that I had scarcely uched the skin before tears started into her eyes. When very gently suggested that her pain was perhaps aggravated y fear of what the symptom connoted—a suggestion with hich the patient usually agrees cheerfully in relief at hearing at she has not got cancer—I was met with a torrent of xpostulation. "That she said, is exactly what the man ho took my tonsils out said. Three weeks after the operation y throat was in agony and when I went to see him he said e could find nothing whatever the matter I told him there ust be something the matter and would he please look gain? He soon had to change his tune because when he had another look he said that he could see an exposed nerve which he would touch with a little cocaine And do you know the very instant that he touched the nerve the pain completely disappeared. Of course he had to apologise."

That is the sort of patient who suffers from intolerable" pain in the breast in fibroadenosis, and who fails to be comforted by reassurance What the correct treatment is, I know no more than I know the correct treatment for other psychoneuroses but certainly the knife" has no place.

FIBROADENOMA

The encapsulated form of this disease, the so-called fibroadenoma, is not usually associated with pain For this there is a simple anatomical explanation. The histological picture of fibroadenoma is usually coloured by the fibrous-tissue proliferation and epithelial hyperplasia is minimal although the picture may closely resemble that of fibroadenosis. We might therefore expect a good deal of pain in fibroadenoma but the one important histological difference (and it may be the only difference) explains why pain is usually absent In a section of fibroadenoma there is never any fat to be seen in fibroadenosis there invariably is Thus fibroadenosis is an *inclusive* disease incorporating the substantia propria of the breast including fat and nerves and is therefore painful; fibroadenoma, on the other hand is an *exclusive* disease pushing the breast away in front of it and containing neither the fat nor the nerves proper to the breast substance so that it is painless When a fibroadenoma is associated with pain this is because it is surrounded by an area of fibroadenosis.

MALIGNANT DISEASE

Pain is a symptom in about 20% of cases of carcinoma of the breast As with secondary deposits in the liver or skin tumours of the breast are usually not painful unless they are rapidly growing In the breast however the accommodative powers are so great that rapidity of growth alone does not usually give rise to pain Thus the very rapidly growing lactation cancers are not necessarily painful if they are encephaloid and it would seem that here again fibrosis—and a rapidly increasing fibrosis at that—is the essential pain producing agent the mechanism being presumably much the same as in fibroadenosis. For this reason pain with carcinoma of the breast is an uncertain guide to prognosis On the one hand it may signify a rapidly extending growth and on the other a bustling mobilisation of the fibrous tissue defences Pain as an early symptom of cancer of the breast is discussed by Corry (1952) The practical aspect of this relation is that the patient must not ignore a lump in the breast because it is not painful, nor must the doctor be persuaded into diagnosing such a lump as innocent because there is pain

An advanced cancer of the breast may be exquisitely painful If we cut or otherwise stimulate a sensory nerve along its course then impulses characteristic of the nature of that nerve are appreciated in consciousness although no specific nerve-endings exist within the nerve itself; we can that is short-circuit the nerve endings and by a non-specific stimulus excite the specific response Thus, excitation of the optic nerve by whatever stimulus produces a visual sensation often that of a blinding flash and stimulation of a pain nerve will produce pain although no nerve-ending is involved and the stimulus would not ordinarily be painful

In certain cases of advanced cancer of the breast it would seem that this mechanism operates. The cancer eroding into the chest wall grasps, envelops, and finally destroys sizable branches of the intercostal nerves In so doing it stimulates these nerves and as might be expected most if not all, of the axons being unable to escape are involved Then the pain is intense and usually far more severe than when the mechanism is stimulation of the nerve-endings, which being *endings* are to a certain extent free to yield before the advance of the cancer like reeds in the wind and so avoid the distorting influences which would stimulate them

In this way local invasion of a breast cancer may be very painful and may require the exhibition of drugs to relieve this symptom On the other hand any agency which will arrest or even slow, the process will alleviate the pain by allowing the nerves time to accommodate themselves to the changing stresses Prominent amongst these agencies are deep X ray therapy and endocrine preparations For local and regional manifestations already beyond the hope of eradication by surgery—that is stage III cases where there are supraclavicular glands, seedling deposits in the skin or gross *peau d'orange*—X ray treatment is usually preferable When however, in addition there are distant metastases, and the case has reached stage IV, endocrine therapy is always indicated , for this can relieve pain and almost miraculously arrest some growths

In one such case a deep ulcer of the chest wall produced by a cancer of the breast was very painful, probably owing to direct involvement of the pain fibres After two months' treatment with 300 mg of stilbœstrol daily, the ulcer filled up and epithelialised, and melanin pigment appeared in the region of the healed ulcer , the pain had gone This patient is still symptom free nearly four years later, and is taking a maintenance dose of 100 mg of stilbœstrol daily

Skeletal deposits are almost invariably painful, and the last hours of a patient dying from secondary deposits in the spine may be pitiful in the extreme The immense tension generated by the relentless multiplication of the cancer cells within the rigid framework of bone causes a frantic distortion of all the pain nerve-endings in the vicinity and an inescapable stimulation of the nerve-fibres Added to this there is the catastrophe of collapse of a vertebra, when the whole structure comes tumbling down to excite spasms of pain which can properly be described as "intolerable" Here again deep X-ray therapy, hormone therapy, or both, may bring a blessed, if only temporary, relief

In another case a secondary deposit from a carcinoma of the breast had eroded a portion of the frontoparietal region, with throbbing pain at the site of invasion In this case androgens were administered ; and, after three months of treatment with 100 mg of methyl testosterone daily, what was originally an area of rarefaction had become an area of sclerosis, the lump on the head had diminished, and the pain had disappeared

Such cases prompt one to believe that no patient should be allowed to die from carcinoma of the breast without a trial of hormone therapy

What of the cases in which the resources of specific therapy have been exhausted ? There is, I believe, no need for these patients to endure much, nor to endure long, the agonies of apprehension nor tortures of physical suffering Such patients receive a mixture of morphine gr $^{1}/_{4}$ and cocaine hydrochloride gr $^{1}/_{12}$ dissolved in spirit such as gin, brandy, or whisky Four doses daily are prescribed, and the medicine is left by the bedside so that the patient can help herself when she feels the need for relief Such patients are usually calm, mildly euphoric without being fatuous, and sufficiently aware to converse with those they love, without mutual distress, almost to the end

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" One point is beyond all doubt By the application of rational agricultural methods and by an increase in the cultivated area, it is fully possible to satisfy the nutritional needs of the world's growing population. If the fruitful cultivation of our poorer or more remote soils should, like the synthesis of fats prove initially expensive, this should not be considered an impassable barrier , it ought to be thought of as a difficulty that can be overcome by reorganizing the economic apparatus, taking into account the necessity of paying prices high enough to warrant the production achieved Production of foodstuffs can be increased to the point of satisfying fully the nutritional needs of all the human race And the possible contribution of science would be greater still if students of biological problems had only received more stimulus and support from the ruling circles of our time —JOSUÉ DE CASTRO, chairman of executive, F.A.O *Geography of Hunger* London Gollancz. 1952

PAIN IN CARCINOMA OF THE BREAST

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THE occurrence of pain in operable cases of carcinom of the breast is well known to surgeons Its frequency indicated by the following figures

	Pain presenting symptom	Pain and lump presenting symptoms	No of cases	Percentag with pai
Luff (1932)	48	81	931	13·8
Lane-Claypon (1926)	89	140	503	45·1
Cade (1940)	31	70	563	17·9
Geschickter (1945)	116	537	1452	45·0
Truscott (1947)	120	194	1211	26·0

The pain is generally considered to be so variable th it is no help in diagnosis The position as stated b Saner (1950) is that a transient pain in the breast, described as stabbing or shooting, is sometimes mentioned but in most cases pain and tenderness, if present at al indicate an advanced growth

My attention was first directed to the problem by th late Mr Wilfred Trotter, who taught that in certai cases of carcinoma of the breast it was characteristic t get a history of momentary pricking pain in the tumou To investigate this, I have examined the notes of a cases of breast disease admitted to the Radcliffe Infirmar in the last ten years and of my private cases during th period Particular attention has been paid to th incidence and the type of pain described by patient with carcinoma of the breast, chronic mastitis, fibro adenomata, and fat necrosis

INVESTIGATION OF PAIN

An inquiry into pain in the breast demands a histor as thorough as that normally taken for pain elsewher in the body Information is obtained of its situation duration, character, radiation, and aggravating an relieving factors If there is *no* pain, a definite recor of its absence should be made

Situation —The pain may be in a swelling, or mor widely distributed in one or both breasts The significan pains are those localised in a swelling Widespread pain in one or both breasts are almost certainly not due to malignant growth

Duration —Pain may occasionally be the presenting symptom, being the reason why the patient examined her breast Much more commonly it is noticed after discovery of the lump

Character —The pain may be momentary or continuous The most characteristic momentary pain is a stabbing pain, which may be either a single stab, or a quick stab, stab, stab, or a pain described as like a knife or a red hot needle going in These stabs may be severe enough to make a patient wince In a weaker form it is a prick, prick, prick It may occur several times in one day and then not recur for days The stab or prick, to be significant, is in the tumour and not vaguely in the breast. Another momentary pain which is far less common, but which in this series has occurred only in carcinoma of the breast, is a snatching pain It is as if the breast had been suddenly pulled out and then let go

The commonest continuous pain is an ache whose very name suggests that it is a pain which goes on a long time Variants of the aching pain are described as burning pain, gnawing pain, dragging pain, continuous pulling pain, drawing pain, throbbing pain, pain like continuous pins and needles, and pains like toothache These continuous pains will last for considerable times, from ten minutes to some hours They occur both in simple and malignant diseases of the breast They may occur alone or in addition to the momentary stabbing or snatching pain The more intelligent patients try to help by interpreting the pain as like neuralgia or rheumatism both of which mean different pains to different people according to their previous experience Such a description has to be simplified, care being taken not to put ideas into the patient s head for the breast is a very suggestible organ.

Radiation.—A pain which spreads to the other breast to the shoulder, to the neck or down the arm is likely to be due to a simple breast condition A pain which shoots from one breast to the other, or across the chest or to the axilla, is similarly likely to be caused by a non malignant condition On the other hand if the shoot is localised from the lump through the nipple it should be regarded with suspicion

Aggravation —The aching pains in the breast may be made worse by the approach of menstruation and relieved by its onset. This is especially true of chronic mastitis, where a discomfort or any of the varieties of aching pain in all degrees of severity may be felt They start from two days to two weeks before menstruation and are usually relieved by, or soon after its onset All types of pain in the breast are made worse by using the arms so tend to come on after a hard day s work involving sweeping mangling, or hanging clothes on a line All the pains, especially the continuous ones, may be troublesome at night, because lying on the affected breast may cause pain, the patient may have to sleep on the other side or on the back. Stabbing pain may be affected by the weather and occasionally is worse when it is cold

CARCINOMA OF BREAST 1941–50

In the personal series (table I) rather more than half (53%) the patients with carcinoma of the breast have had pain, and over a quarter (30%) have had stabbing or snatching pain. 23 have had both aching and stabbing pain. The aching type of pain occurs more often, and if both pains are present it is usually the aching pain the patient mentions. A definite question has to be asked, such as "Have you any other pain?" and then comes out: "I have had some sharp pains in the breast they only occurred on one or two days every now and then" Further questions have to follow to find out what these sharp pains were like If they were momentary pains such as stab, stab stab in the swelling or a sharp pain like a knife or a red hot needle going in then I expect the physical signs will be those of a carcinoma

SIMPLE OR MALIGNANT?

An inquiry must now be made into how often pain occurs in simple diseases of the breast. As far as the Radcliffe Infirmary is concerned, it is only possible to give the numbers of patients admitted to the wards (table II) because the records system does not classify the out-patients. Many an obvious case of chronic mastitis, with sector-shaped granular areas of induration in the breasts, and premenstrual discomfort or severe pain which is widespread is reassured and given a support and comes neither into the Infirmary nor into the records system

The stabbing pain in these simple conditions has always been a single stab and in chronic mastitis has only occurred when cysts forming a tumour palpable with the flat of the hand have been present Putzki and Scully (1946) refer to stabbing or lancinating pain and think that if it is associated with a lump and slight tenderness it often indicates that the lesion is a cyst

TABLE I—INCIDENCE AND TYPE OF PAIN IN MAMMARY CANCER

Series	No of cases	No pain	No history	Snatch	Multiple stabs	Single stab	Ache
Personal	204	75	20	4	26	30	72
Other Radcliffe surgeons	139	56	31	5	9	10	38
Total	343	131	51	9	35	40	110

TABLE II—INCIDENCE AND TYPE OF PAIN IN SIMPLE DISEASES OF BREAST

Condition and series	No of cases	No pain	No history	Snatch	Multiple stab	Single stab	Ache
Chronic mastitis							
Personal series	160	58	13	0	0	9 (5.5%)	80
Other Radcliffe surgeons	131	46	5	0	0	7	72
Fibro-adenomata							
Personal cases	67	3	4	0	0	2 (3.8%)	[illegible]
Other Radcliffe surgeons	63	35	3	0	0	3	22
Fat-necrosis							
Personal cases	5	1	0	0	0	2 (18%)	2
Other Radcliffe surgeons	6	[illegible]	0	0	0	0	4
Total	432	179	25	0	0	23	205

In my personal series the single stab was present in 6% of 160 cases of chronic mastitis 3% of 67 of fibro adenomata and 40% of a small series of 5 of fat necrosis The figures of the other Radcliffe surgeons show comparable findings.

My conclusion is that a history of two or three stabs or pricks in a tumour in rapid succession or of snatching pain in a tumour makes the diagnosis of carcinoma of the breast fairly certain It occurred in 15% of 204 cases of carcinoma and in none of the 230 simple breast conditions A single stab in a tumour occurred in 15% of the 204 carcinomata in 6% of 160 cases of chronic mastitis in 3% of 67 fibro-adenomata and in about half the small series of fat-necrosis With a tumour whose diagnosis on physical signs is in doubt stabbing pain in the tumour is not enough to establish the diagnosis. The tumour must be excised locally and the diagnosis confirmed either macroscopically or microscopically before one proceeds to radical amputation

CAUSE OF PAIN

It seemed desirable to analyse these cases of momentary pain to see whether they were related to the degree of malignancy of the tumour Malignancy can be assessed either by the histological method of grading or the clinical system of staging Grading was introduced by Broders (1920) for squamous-celled carcinoma of the lip when he showed the prognosis became worse with an increased degree of anaplasia

Grading has been used in carcinoma of the breast and similarly gives help in prognosis (Greenough 1925, Patey and Scarff 1928 Bloom 1950)

I am indebted to Dr H. Cowdell for grading by the method of Patey and Scarff (1928) 46 of the cases of carcinoma with stabbing or snatching pain as follows:

	Grade I	*Grade II*	*Grade III*
Stabbing and snatching pain	10 (*21%*)	25 (*66%*)	6 (*13%*)
Bloom series	141 (*30%*)	101 (*41%*)	138 (*29%*)

From this it will be seen that most of the cases of stabbing pain are in grade II and not in the more anaplastic grade III The incidence of stabbing pain does not increase with increasing histological malignancy

Staging is a clinical method of recording the stage reached by the growth

Stage I —The growth is confined to the breast including cases with dimpling and minor attachment to the skin

Stage II —In addition, there are mobile secondaries in the axillary lymph nodes.

Stage III —The growth is extending beyond the breast as shown by wider involvement of the skin or attachment to the deep fascia.

Stage IV —Growth in axillary glands has spread beyond their capsule causing fixation or there are secondary deposits in the skin wide of the tumour or supraclavicular glands, or distant metastases

For this inquiry stage II has been subdivided into moderate granular involvement when one to four glands have secondary growth, and severe glandular involvement when five or more axillary glands have metastases

For the sake of accuracy the figures are based on the pathological reports, because clinical judgment gives rise to a larger element of error

The following is an analysis of the stage I, stage II, and stage III cases in this series

	Stage I	*Stage II*			*Stage III*
		1–4 glands involved	*5 or more glands involved*	*Tota*	
No pain	37	(22	12)	34	4
Stabbing or snatching pain	14	(17	21)	38	3

In the cases with no pain, stage I and stage II cases are roughly equal Of those with stabbing pain there are more than twice as many in stage II as in stage I, with an undue proportion with heavy glandular involvement.

SUMMARY

Pain occurred in about half of a series of 204 operable cases of carcinoma of the breast

The pain may be subdivided into momentary and continuous pain The significant history is two to six stabs or pricks in the tumour in quick succession, or a snatching pain in the tumour This was noted in 15% of the 204 cases of carcinoma but in none of a series of 230 simple breast conditions

It proved impossible to correlate multiple stabbing pains with the histological grade of the tumour, though there was some suggestion that such pain was commoner in cases with heavy glandular involvement

A single stab in a tumour occurred in 15% of 204 cases of carcinoma, in 6% of 160 cases of chronic mastitis, in 3% of 67 fibro adenomata, and in about half of a small series of fat necrosis

Varieties of aching pain are described and their significance considered

I wish to thank the other surgeons of the Radcliffe Infirmary for the use of their notes

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RADIOGRAPHY OF THE HUMAN BODY WITH RADIOACTIVE ISOTOPES

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Modern developments of physics have already influenced a number of branches of medicine and have introduced techniques of fundamental interest into its basic sciences, such as biophysics and biochemistry Moreover direct applications of nuclear physics in radiotherapy are growing in importance and it must be assumed that during the next few years this tendency will continue So far, the influence of the newer physics on diagnostic radiology has been small, but it appears that there are a number of possible applications This note is concerned with one of them

RADIOGRAPHY WITH RADIOACTIVE ISOTOPES

It was suggested (Mayneord 1950) that it might be possible to use a strong radioactive source as a radiographic focus placed inside the body, and thus obtain some unconventional view of structures often confused b superimposition in the normal radiographic techniques.

It is first necessary to remove one important mi conception Physicists normally use the term "gamm rays" for all radiations emitted from the atomic nucle and it has been assumed very generally that these gamm rays are necessarily very penetrating and therefore little use in providing the contrast necessary for satu factory radiographs of the human body In fact number of radioactive substances emit gamma rays who average energy is small, and there are a number instances in which this energy is less than the equivale of 100 kV (0 1 mev) An example of a gamma ray sourc of this type is an isotope of xenon whose mass number 133 (xenon 133), which emits gamma rays whose energ is the equivalent of 85 kV—i e, in the diagnostic rang Although a number of radioactive isotopes emitting lo energy gamma rays are known, for many reasons most them are quite unsuitable for the purposes we have i mind They may also emit radiations of high penetratio in the normal gamma-ray region, they probably wi emit large numbers of beta rays which may be of hig energy, their lives may be so short as to make their us impracticable, or alternatively they may be available i such small quantities that times of exposure would b absurdly long Much work has been done in industri radiography with high energy radioactive isotopes suc as cobalt 60, but recently a gamma-ray source of lo energy, thulium 170, has been shown to possess a numbe of advantages in the radiography of light alloys. We (1951) gave a preliminary account of this material an its use in experimental industrial radiography Althoug thulium 170 is only one of several possible sources, i seemed worth while to carry out preliminary experiment and to look more closely into the physical problems of it possible applications in medicine

PHYSICS OF THULIUM 170

All observers agree that thulium 170 emits gamma ray having an energy of approximately 84 kV, in additio to beta rays These beta rays may be divided into two groups having maximum energies of 884 and 968 kV respectively, most of the beta particles (76%) belonging to the second group The present belief is that thulium 170 disintegrates by two routes, one high energy beta-ray group goes directly to ground-state ytterbium 170, and the other (24% of the total transitions) goes to an excited state of ytterbium 170, which then emits the 84 kV "X rays" This electromagnetic radiation is monochromatic and corresponds in penetration to X rays produced at a higher voltage than 84 kV, since in an X-ray tube the applied voltage defines the maximum energy of radiation and the mean energy is considerably less However, there are complexities in the radiation from thulium 170 because the gamma rays are partially absorbed ("internally converted") in the outer electronic shells of the nucleus from which they are emitted, with the result that characteristic X rays of ytterbium are also present Moreover, the high-energy beta rays produce penetrating X rays, of relatively high voltage, from any material surrounding the thulium The radiation coming from the material consists therefore of a mixture of gamma rays of 84 kV, characteristic X rays of ytterbium with energies in the region of 50 kV, and also penetrating components making up a small fraction of the total radiation Much more information is required before we can say accurately what radiation is in fact emitted, but there can be no doubt from results already obtained that the bulk of the radiation is gamma rays of about 84 kV quantum energy with ytterbium X rays added (Graham and Tomlin 1949, Grant and Richmond 1949, Grant 1950, Fraser 1950, Graham 1951) We have investigated the absorption of the radiation in carbon, magnesium, water, and gold, and this work will be

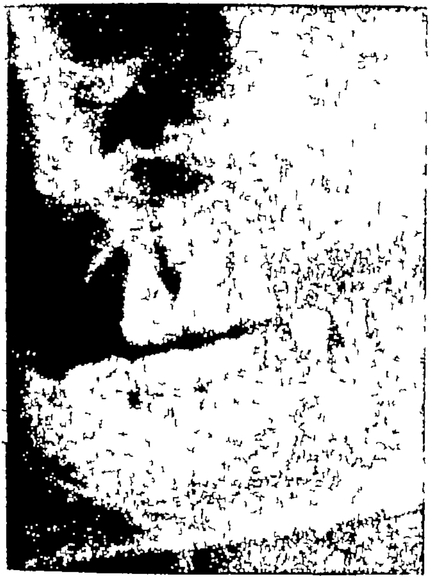

Fig 1—Mandible of dried skull taken with thulium source in mouth.

described elsewhere. There are two main components of the absorption some 70% of the radiation has an absorption agreeing with 84 kV quantum energy and the rest to the known wavelengths of ytterbium X rays The mean absorption corresponds to radiation of about 75 kV quanta.

We shall not here discuss what amounts of radiation might be expected per millicurie of thulium 170 this subject has been considered previously (Mayneord 1950) But we have estimated theoretically the intensities of radiation, and these calculations are the basis of the exposures and doses described below Until the disintegration scheme is agreed upon we cannot decide finally on a "millicurie" and have therefore measured directly the amount of radiation from our source, using air wall condenser chambers under carefully defined geometrical conditions.

Of the protective materials required gold is theoretically the best and has in fact been found by experiment to possess a very high absorption coefficient for the radiations from thulium Its K absorption limit lies just to the long wave-length side of the main thulium 170 radiation and a thickness of 1 mm of gold reduces the radiation to some 3% of its initial intensity

Details of the manufacture of radioactive isotopes in the chain reacting pile may be found elsewhere (Mayneord 1950), and we need only mention here that thulium 170 is obtained by placing thulium a rare earth of the lanthanide series, in the pile and irradiating with slow neutrons. Normal thulium (stated to consist entirely of thulium 169) captures a neutron to form thulium 170 The build up curve (West 1951) indicates that, by irradiating for a year or more we may be able to manufacture isotopes whose activities are at least 5 curies per g The long time of irradiation needed to reach this specific activity is related to the relatively long half life of thulium—namely, 127 days Thulium itself is an expensive material, but the high cost is offset by the advantages of a source whose life is virtually infinite since the thulium may be replaced in the pile and reactivated when necessary The material is at present best prepared in the form of small flat discs by pressing and sintering the oxide. These discs can be irradiated together or separately and small sources built up in this way

PRELIMINARY RADIOGRAPHIC EXPERIMENTS

For preliminary experiments chips of thulium oxide, weighing only a few milligrammes, were used in the bottom of a small glass tube into which they were sealed by an ebonite rod which fitted the tube. This rod has a small depression in its end thus effectively making a point source at the bottom of the tube. To cut out the intense beta radiation a block of 'Perspex' was turned so as to form a sphere enclosing the point source, the radius of the sphere being 5 mm just sufficient to stop the beta rays (Perspex is convenient to handle is transparent to light and X rays, and is one of the least efficient materials for the production by beta rays of the undesirable secondary X rays These X rays must clearly be avoided because they give a large dose to the tissues near the source and because they cause lack of contrast in the pictures) This device is essentially a sphere of perspex 1 cm in diameter at whose centre lies a small radiation source on the end of a rod of about 3 mm in diameter Such a source is extremely convenient for experimental work for example, in the mouth or other body cavities It could probably be made smaller but the dose at the surface of the sphere would then be

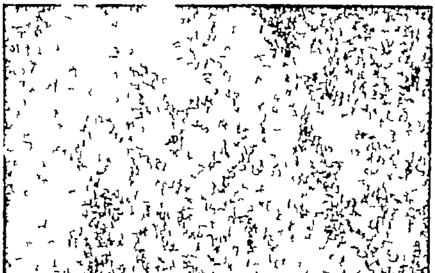

Fig 2—Maxilla and mandible of dried skull taken with thulium source in nasopharynx.

greater This dose is quite small (5–10 r) for a radiograph at about 12 cm focus-film distance

Knowing that about 60 mr will produce a density of one in the normal X-ray film, and that this figure may be reduced to about 5 mr when intensifying screens are used, we could calculate the exposure required The present source is a feeble one and the experimental exposures have often been very long—e g, ten or eleven hours for a source film distance of about 12 cm Screens, under the same conditions, reduced the exposure to one hour We have also taken pictures of limited areas of a living subject with exposures of only five minutes

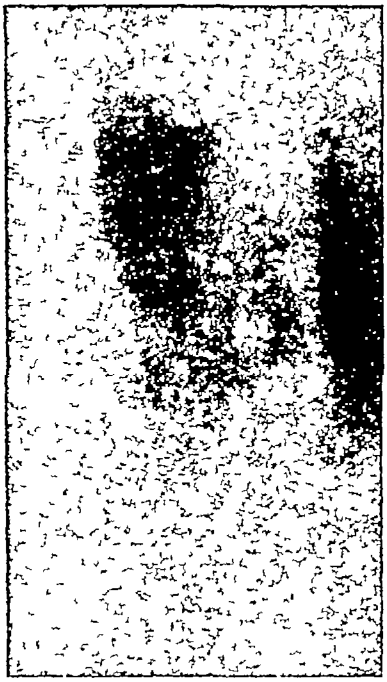

Fig 3—Part of metacarpus of living hand taken with thulium source at 6 cm and with five minutes' exposure.

The first experiments were carried out with a dried skull Fig 1 shows the picture obtained by placing the source at the centre of the buccal cavity of such a skull The satisfactory picture of a number of teeth simultaneously is promising, the gaps between the teeth are clearly shown as the rays fall orthogonally to the mandible The advantages of taking a number of teeth at once and of avoiding superimposition on the opposite mandible are obvious Fig 2 shows a typical example of the kind of radiograph obtained by placing the source at a point in the skull corresponding to a position in the naso pharynx, the freedom from shadows of other structures is again apparent It is clear that this method can give pictures of reasonably good definition and contrast, and it seems probable that in certain body cavities such a source would produce new and interesting views

Dental and skull radiography are perhaps the first obvious applications of the new method By the use of small focal distances, photographs of parts of limbs may be obtained even with our weak sources Fig 3 shows such a photograph of a living hand taken in five minutes with a source-film distance of 6 cm

Preliminary calculations show that radioactive isotopes are unlikely to compete seriously with the classical radiographic techniques, because very large amounts of radioactive material would be required, but the advantages, in both peace and war, of a small source of X radiation, free from electric mains and complex equipment are apparent The main problem is in fact the production of sources of sufficient strength and concentration which will give an approximate point source This is by no means impossible in piles of high neutron flux, and we are trying to obtain material of the required high specific activity Some gaseous fission products, which could be compressed and concentrated, may well be available in large quantities and may prove suitable

Low energy radiators of this kind have many other possibilities They can, for example, be used in scanning techniques such as that recently developed for the study of radioactive sources (Mayneord et al 1951). Preliminary experiments with a number of radio isotopes have been carried out in this way A very useful apparatus may be constructed with a Geiger counter, or a scintillation counter, on to which an arm has been fixed holding a small source of a radioactive isotope on the central axis of the aperture In this way an invisible probing beam of radiation is obtained and, of course, thulium may be used as the source This Geiger or scintillation counter may be used in conjunction with a portable counting-rate meter, thus providing a small portable apparatus which will measure the absorption of radiation in different parts of the body and which may be used in attempts to plot the outlines of organs There is little doubt that such an apparatus could sometimes be used in localising foreign bodies We have found in preliminary experiments that metallic foreign bodies, 1–2 mm in size, can be located in a wax phantom with this apparatus, which is small, mobile, and needs no mains supply These techniques are possible even with much smaller quantities of radioactive material than are already available

SUMMARY

Preliminary work suggests that, if sources of sufficient activity can be obtained, radioactive isotopes emitting low-energy gamma rays will be of use in diagnostic radiology Satisfactory photographs have been taken with thulium 170, but long exposures are at present necessary In associated fields of medicine they already provide many new opportunities A fuller account of these developments will be given elsewhere.

I would like to acknowledge the help of members of the Isotope Division of the Atomic Energy Research Establishment, Harwell, in supplying materials for these preliminary experiments, and in a number of discussions In particular, I wish to acknowledge the help received from Mr R West, whose note brought thulium to my attention I am also indebted to Mr R L Graham of the Research Division, Atomic Energy Project, Chalk River, Ontario, for unpublished information on the physics of thulium These investigations were supported by the Medical Research Council, to whom my thanks are due

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PSYCHOSOMATIC SYMPTOM FORMATION

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INTEREST in psychosomatic illness is growing, but the exact connotation of the term still varies widely There is even disagreement on whether to speak of psychosomatic illness, psychosomatic states, psychosomatic personality types, or simply psychosomatic symptoms. The immediate task seems to be the study of the mechanism of psychosomatic symptom formation In the absence of such basic understanding, a claim that there are definite psychosomatic personality types is premature and either speculative or superficial

Observation and experience during psychotherapy are a legitimate source of information Indeed, it can be argued that the true psychodynamic formulation—i e, the diagnosis—must take into account the patient's response to psychotherapy, and therefore can finally be clinched only in retrospect at the end of treatment. The present study is mainly based on patients with diseases of the skin, groups of patients with similar symptomatology were selected and their common features studied

Introduction

Psychosomatic illness must be distinguished from the "pathoneuroses" (Ferenczi 1924) This term is useful to describe neurotic symptoms attributable to an organic disease or an injury—e.g., castration anxieties following injury to an eye. Furthermore the term "psychosomatic" should not be extended to mean that every physical illness has its psychological counterpart and vice versa. The use of "psychosomatic" for any and every interaction between body and mind does not help to narrow down the concept to a precise meaning

WHAT THE PSYCHOSOMATIC SYMPTOM IS NOT

It is most important to avoid confusion with hysterical (psychoneurotic) symptom formation for such confusion has obstructed research into the special mechanism of psychosomatic symptoms. It is true that the term "hysterical" is not always free from ambiguity It is used here in accordance with Freud's definition of the classical psychoneurotic symptom formation as a symbolic expression of a repressed (unconscious) conflict arising in the Œdipus phase being primarily based on castration anxieties The symptom represents a compromise between the repressing (ego) and the repressed (libidinal) forces; the social or secondary gain extracted from the environment is substantial The hysterical conversion symptom is thus a complex end product of a mental (endopsychic) defence It is amenable to the classical psycho analytic technique

But not all physical symptoms fall under the heading of "conversion hysteria" in this strictly defined sense Freud was well aware of this: as early as 1894 he insisted that a group of physical symptoms should be kept separate as "anxiety neuroses," and he classed them as "actual neuroses" in sharp contradistinction to the psychoneuroses. He emphasised that such symptoms as giddiness, nausea, palpitations sweating diarrhœa and vasomotor disturbances are not end products of conflict that they are without meaning and content and that they cannot be reduced by the psycho analytic technique, they are "anxiety equivalents" For historical reasons this concept has not received due attention In the study of psychosomatic symptoms Freud's early observations are relevant his repeated warnings that these somatic symptoms are not psychoneurotic have not always been heeded Such clumsy terms as pregenital conversions, organ neurosis, somatic compliance and somatisation can be quoted as examples Ferenczi (1924) one of the first psycho analysts to make valuable contributions to the study of physical symptoms, flatly stated that it is not permissible to translate physiological functions into psycho analytic terms.

This introductory digression shows our starting point Guided by the principle that therapeutic experience is essential in assessing the nature of a symptom the next step in approaching the problem is to summarise for comparison the psycho-analytic treatment of psychoneurotics, and to mention briefly the treatment of psychotics.

Treatment of Psychoneurotics and Psychotics

The classical psycho analytic technique provokes in the psychoneurotic a regression to infantile levels (Macalpine 1950) in order to bring into consciousness repressed traumatic memories and phantasies and so reach "locked-up" affect* The object is to analyse and so to reduce the symptom which the psychoneurotic has unsuccessfully built up as a defence against anxieties The aim of the standard technique, therefore, is to reactivate old anxiety situations. The patient's material is allowed to unfold freely without concentrating on the symptom. Psychoneurotics during treatment form analytic transferences of a definite pattern hence transference neuroses."

The treatment of prepsychotics is in many ways the reverse Too much unconscious material has erupted into their conscious minds, and treatment must aim at repressing it again Federn (1947) states that in his experience to help the recovery of prepsychotics,

> two ends are sought by the analyst: the therapist directs the patient to focus his attention upon his special conflicts, which resulted in the break through of unconscious material One part of these conflicts lies in the present reality situation, the other derives from material which previously was repressed The former is usually neglected by the patient and its connection with unconscious conflicts ignored When this is revealed the understanding of the unconscious part becomes more easily accepted.

The Psychosomatic Symptom

Experience with psychosomatic patients differs from that with psychoneurotics and also though less widely from that with prepsychotic patients These differences point to certain features which are characteristic of the psychosomatic symptom and they give some indication of its particular mechanism.

TRANSFERENCE

Transference does not develop in the same way as it does in the transference neuroses. It is sometimes stated that psychosomatic patients do not form transferences at all but in my experience this view is too extreme It is true that positive transferences, particularly of the stormy hysterical type, do not as a rule develop However if the therapeutic situation is carefully handled, negative transferences—i.e., the display of aggression, hostility and suspicion—appear abundantly Transference behaviour therefore resembles more closely that of the psychotic

PRECIPITATING FACTORS AND "COVER CAUSE"

I have always found that the outbreak of a psychosomatic symptom can and must be traced to a recent reality stimulus. Here again there is a resemblance to the outbreak of a psychotic episode and a difference from the psychoneurotic symptom which is caused by a disturbance of instinctual drives. In the psychosomatic case it is of paramount importance to detect this recent reality situation and what it means to the patient, and to find the emotion which has thereby been stirred The patient is hardly ever aware of it. Should he have related the outbreak to any particular event in his life, this is invariably found to be a "cover cause" (MacKenna and Macalpine 1951) This point cannot be emphasised too strongly because precipitating factors are often taken at their face value a loss in prestige a loss of love experience of battle or other perilous situations are regarded as standard "trigger" factors Such glib assumptions do not do justice to the individual dynamic situation of a patient their authors ignore the fact that psychosomatic, as well as psychoneurotic and psychotic illness can never be understood without taking into account the operation of unconscious mechanisms Too frequently conscious problems or difficult life situations as such are assumed to have pathogenic value and to cause psychosomatic symptoms. Everyday experience contradicts this.

One of the most impressive and common "cover causes" given by the patient is the reference to time We have found it useful to search for anniversaries and their particular meaning or to find out what lies hidden behind an outbreak of say urticaria recurring at a definite hour of the day For example:

A girl had had a disfiguring skin lesion on her face for 7 years. It started one January shortly after she had been jilted unexpectedly by her boy friend She was not aware of this link, although there was an exacerbation every subsequent January She was urged to relate the detailed story and to allow herself to feel and vent her fury with the boy which her pride had prevented her from doing at the time When the skin lesion had almost disappeared, she queried the significance of psychological factors, "because her face was always worse in January," implying that the cold wind irritated her skin She tried to cling to the "cover" of a seasonal implication. When she was casually asked to give the date of her disappointment again, she made a slip and named a wrong month When this was brought to her notice, she quickly gained insight and said "now I can see that I never allowed myself to feel the impact of this affair"

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* This is the translation of "*eingeklemmter Affekt*" (Freud 1893) the official translation as "strangulated affect" is unfortunate

Another common "cover cause" is temperature The influence of heat is so often clearly used as a cover that when a patient says "it is always worse when I get hot," I jokingly retort "do you mean hot and bothered?"

UNCONSCIOUS FACTORS

Not only is the patient unaware of the significance of the reality stimulus, but he is also unaware of the emotion which he is somatically displaying in his symptom With skin patients one has the great advantage over other psychosomatic conditions in that the lesions are directly observable throughout treatment, both in their changes from session to session and in their response to certain topics under discussion It is as if the symptom spoke a more direct and expressive idiom than words An attack of scratching or the reddening of an erythema yields more reliable information than the patient could consciously give In this respect skin patients are ideal, observations can be made without disturbing the interview by taking, say, blood-pressure readings, or having to ask the patient direct questions about his complaint

Although the therapist must never lose sight of the symptom, the patient should not be made to concentrate on it, but rather give himself to free association, albeit guided by the therapist To draw a patient's attention to the symptom only stiffens his resistance and may make him cling to it I came to appreciate this through the converse observation of patients who meticulously and unswervingly describe and discuss only their symptom In their endeavour to stress a purely somatic origin and to deny even the possibility of psychological causes, they seem to "protest too much" Their conscious negation amounts to an unconscious affirmation Such behaviour can, with a little patience, be exploited to achieve quick therapeutic results Indeed we take it as a good prognostic sign We avoid impressing on patients that they are undergoing psychological treatment, they sometimes assume that the interviews are for extended history-taking or for diagnosis

An intelligent man of 48 had for 6 years suffered from angioneurotic œdema and urticaria, and was referred by the dermatologist for what the patient assumed to be yet another test He improved and, after 6 weekly interviews, said that it had suddenly dawned on him that perhaps he was mistaken and these interviews were not for diagnostic purposes, "because they had done him so much good" "Had this then," he asked puzzled, "been treatment all along?"

We have even had patients who, when their symptom had cleared up after a few sessions, expressed satisfaction that psychological treatment had not been necessary

INFANTILE FACTORS

Having discovered the reality stimulus and its importance for the patient, and having found the emotion evoked and allowed sufficiently for its free discharge, the next step is to connect the immediate cause with unliquidated childhood situations We try to do this unobtrusively, casually asking whether a patient has had similar feelings in the past Only then is it possible for him to understand his skin symptom in terms of emotional behaviour, and to appreciate the precipitating cause in its true light We have found that if the patient understands the mechanism of his symptom this consolidates the therapeutic gain and helps to avoid recurrence

A woman of 42 had been suffering for 18 months from intense reddening of her face, the skin was scaly, burning, and itching She was competent and happily married, and worked as a clerk in a sub post office It was noted that she scratched her face when talking about the sub postmaster He had thrown suspicion on her, because money was disappearing from the till, and she was furious but helpless. This revived her childhood situation when she reacted with rage to being unfairly accused by her mother of her sister's wrongdoings Her mother was alive and the patient visited her regularly, although she felt that she was not on intimate terms with her, she held nothing against her mother By the time this stage of the investigation was reached, her skin lesion was much improved, apart from minor exacerbatio which she attributed to exposure to cold winds on t occasions "after taking a little stroll to the letter box" turned out that each time she had posted a card to her moth to announce a visit. When this connection was revealed a discussed, the patient realised that the postmaster, like h mother, provoked a rage response of which she knew nothin but which found expression in her symptom She had recurrence

Sometimes patients with eczema impress the observ as being in a state of rage, although they do not know it the rage response can, however, be impressively demo strated, when a violently scratching patient is told stop scratching If such an emotion is traced back earlier situations, it is found that these patients ha always tended to fly into a rage easily Often they clear remember suffering from tantrums, or they may reca certain moments in their lives when they gave up th behaviour and became conforming, quiet, restrained, an "bottled up" This change in behaviour takes place response to a reality circumstance, in which the show hostility is either forbidden or impracticable and impo sible It is not an ego or super ego restriction again instinctual inner danger, as is the case in the formatio of the psychoneurotic symptom Rage responses a commonly found in psychotics, they are rare in psych neurotics (Glover 1949), they play a major part psychosomatic patients

Continued treatment often reveals that the rag response disguised in a symptom is a cover for, or th reaction to, underlying deep anxiety One is reminde of the destructive child whose behaviour is often a expression of such anxiety

A seriously ill patient had been in hospital for 7 month with generalised dermatitis Scratching madly in franti paroxysms, she was approached by the therapist for the fir time with the question "what have they done to you?" This produced immediate surprise, because the patient wa usually addressed reproachfully with "what are you doing why are you scratching?" Thus good rapport was quickly established, the question implied that the therapist understood that, although destructive in behaviour, she was actually in a state of intense anxiety

To be understood seems to mean to the patients that their behaviour is tolerated and allowed, whereas their state of suffering is minimised by reassurance and denied by not being understood

DIAGNOSTIC IMPORTANCE OF SECONDARY GAIN

Whereas the psychoneurotic patient commonly exploits his symptom for secondary (social) gain—i e, to extract love, sympathy, or consideration from other people, or to injure and inconvenience them—the secondary gain in psychosomatic patients is inconspicuous or absent The very absence of secondary gain makes successful treatment surprisingly short in some cases, and its absence has diagnostic value In this respect again psychosomatic symptoms correspond closely to psychotic behaviour where secondary gain from illness is clearly absent. It is important to stress the irrelevance of secondary gain in psychosomatic symptoms which are not the ' easy way out " or a means of displaying aggression with impunity Over emphasis of secondary gain ignores, in favour of a superficial conscious explanation the importance of unconscious factors It also insidiously infers an attitude of " if only you would pull yourself together " and implies an unjustified charge of malingering Further it introduces the therapist s own moral evaluation of a patient s personality as " not a good one." This attitude encourages treatment by reassurance, admonition, or subjugation Treatment on such lines can be successful, at least temporarily, and so it may naturally have the value of expediency but it teaches little or nothing about the nature of the disease, its merit for scientific evaluation is doubtful and its conclusions are often misleading

DISGUISED EMOTIONAL EXPRESSION

The therapist's main aim is to discover which emotion is being expressed in the symptom Close observation of the clinical manifestations the patient s general behaviour his pupils and his voice and the impression gained from his mimic play, are indications To ask the patient whether he is aware of any emotion will never yield results. A psychosomatic symptom is not accompanied by conscious awareness of the emotion which it expresses Indeed, this emotional expression is only a partial one and may account for the patient's failure to recognise it. A patient for example, suffering from palpitations or generalised sweating with none of the other signs which together go to form the expression of anxiety displays only partially the physical accompaniments of the emotion. It may take many therapeutic sessions to get a patient with prolonged hyperidrosis to understand that such an isolated symptom is due to anxiety Patients with disabling sweating of the palms bring out even more clearly this partial display without awareness of anxiety

LACK OF AFFECT

It can therefore be said that a psychosomatic symptom is a rudimentary disguised and only partially expressed emotion, somatically displayed without awareness of its significance. It is abortive behaviour which however does not achieve its purpose—i.e , to alter the environment. Instead of leading to changes in the outside world or to adaptation in the patient it stops half way and produces changes only in the body Instead of being alloplastic, it is autoplastic instead of leading to action and then subsiding it persists. It is this persistence which produces pathological changes—i e., the symptom One might go further and say that reality is denied to some extent. Here again, psychosomatic behaviour approximates to psychotic behaviour Emotional expression if unrelated to reality, bears the psychotic stamp one need only think of an adult continually talking to himself or laughing alone Thus, the psychosomatic symptom is not a defence against a conflict; it is the persistence or partial break through of an emotional state No conscious feeling tone goes with it, and the patient no longer feels the appropriate affect †

Therapy must be directed towards getting the patient to experience the emotion, and so to display all its physical signs This seems to be in accordance with the James Lange theory which in its later more acceptable form maintains that awareness of an emotion is inseparable from its physical manifestation

If psychosomatic symptoms are closely related to emotional behaviour, detailed study of emotional expression should yield more information but relatively little is known of this There is not even agreement as to whether anxiety should be classed as an emotion and, since many psychosomatic symptoms are related to anxiety certain observations are indicated.

ANXIETY

The anxiety underlying psychosomatic conditions is of a primitive disruptive kind a state of helplessness and panic caused by overstimulation and lack of adequate discharge in the primitive organism before the mind is developed It is the " inner experience of catastrophe ' (Goldstein 1951) Such anxiety is different from the castration anxiety which is assumed to be at the bottom of the psychoneuroses and which has adaptation value because it furthers mental and moral development The psychosomatic symptom is a remnant of an early anxiety state as it is experienced by the body mind unit in its preconceptual and preverbal phase In its very primitiveness it resembles psychotic behaviour

THERAPEUTIC PRINCIPLES

I have studied the psychosomatic symptom in the conviction that its behaviour during treatment is an essential aspect of its mechanism I was led to the conclusion that the classical psycho-analytic technique is unsuited for such patients, because unlike the psychoneurotic, their need is not primarily the undoing of faulty defences and the revival of unliquidated anxiety situations On the contrary like psychotics they suffer from an excess of anxiety, against which they cannot defend themselves and which therapy must help them to reduce A further addition is often detrimental and may lead to psychotic episodes. This is in keeping with psycho-analytic experience that accepted psychosomatic illness —e.g asthma and eczema—prove refractory to the classical technique Stressing the principles of the therapeutic approach does not imply that modified analytical methods always lead to quick success they often do not. The therapist must keep up a " reality relationship " with the psychosomatic patient, and he must afford adequate opportunity for abreaction, which the standard psycho analytic technique with the patient isolated on the couch does not provide Abreaction is dependent on changing reality and short of this can only be effected in the presence of a person who by word or mimic play, can be accepted as a substitute

MIXED FORMS

It remains to add that psychosomatic symptoms may, but need not, accompany either psychoneurotic or neurotic character formation If they do they owe their origin to that amount of anxiety which escaped being bound in the neurotic symptom This is in accordance with Freud who held that diverse mechanisms are employed side by side in one person He believed that at the root of every psychoneurotic symptom there is a core of " actual anxiety around which the psychoneurotic symptom forms as the pearl round a grain of sand.' During psychotherapy it is sometimes found that a psychoneurotic symptom may improve simultaneously

A man of 58 had suddenly developed a severe itching rash of his body and at the same time a morbid fear of using his cut throat razor This was traced to severe anxiety which had unconsciously been roused through the possible death of his 90 years-old mother When the skin rash had subsided after 4 weekly sessions, he reported to his and the therapist's surprise that the razor no longer frightened him 12 months later, he answered the customary greeting of " how are you ? " with " thank you, my mother is still well "

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† The terms " affect and emotion need clarifying They are sometimes used synonymously, so that affective behaviour comes to mean emotional behaviour Purely from an etymological angle this is inaccurate. Some confusion in psycho-analytic literature is traceable to Freud's definition (1917) He says that an affect is in any case something highly complex. An affect comprises firstly certain motor innervations and discharges; secondly two kinds of feeling (1) awareness (perception) of these motor discharges and actions (2) the pleasure or pain sensations which lend to the affect its so-called feeling tone. This definition of " affect ' describes what is more commonly called an emotion because it implies efferent innervation. It will here be used as emotion Affect will be used to mean feeling tone and awareness (In these quotations I have not followed the official translation of Freud)

It is instructive to note that symptom formation can be prevented by a small reduction in anxiety , conversely, a small addition of anxiety may produce a disabling symptom Symptom formation is dependent upon a quantitative factor, and this, I suggest, should be an additional warning against too readily formulating psychosomatic personality types

CLINICAL COURSE

Psychosomatic symptoms differ from those of psycho neurosis in their clinical course A hysterical conversion symptom or a compulsion is usually chronic, with only minor fluctuations Psychosomatic symptoms are sporadic or remittent, with intervals of perfect freedom —e g , asthma, eczema, ulcerative colitis, and duodenal ulcer Here again they rather resemble some of the psychoses

SYMBOLISATION AND PATHOLOGY

It has been stressed throughout that the psychosomatic symptom should be distinguished from the hysterical This is particularly true with respect to symbolisation The hysterical symptom expresses, in symbolic form, a conflict or an idea It " converts " a mental concept into a significant bodily symptom, as when a paralysed arm expresses a wish to do a forbidden deed This is *not so in psychosomatic symptoms* A weeping eczema does not owe its origin to a repressed wish to shed tears It is true that all physiological processes (e g , lacrimation) may secondarily acquire a symbolic meaning, but they are not caused by it There is a tendency among workers in this field to carry the concept of symbolisation so far that even physiological functions themselves are so explained

The hysterical symptom is the symbolic conversion of a mental concept , the pathology of a hysterical paralysis or anæsthesia is "cortical," its innervation has no anatomical basis, and, since it does not follow the distribution of nerves, its pathology is often called "anomalous " The psychosomatic symptom has as its starting point a physiological function—namely, emotional expression When this is disturbed by being persistent, exaggerated, isolated, or only partially displayed, it leads secondarily to a pathological change, the psychosomatic symptom

Conclusions and Summary

The psychosomatic symptom can be identified by the following characteristics

(1) It is a rudimentary, disguised, persistent, and only partially expressed emotion without awareness of the appropriate affect

(2) It is not caused by a need for symbolic dramatisation, although it may secondarily be invested with symbolic meaning

(3) Its pathology can be understood in terms of disordered physiological function

(4) Its clinical course is remittent

(5) Secondary gain is insignificant or absent

(6) In all its features it resembles psychotic behaviour

(7) It differs fundamentally from the psychoneurotic symptom in that it is not a defence mechanism of the developed mind, *and thus not " psychogenic "*

(8) It is not the result of conflict but of lack of adequate discharge (and consequent overstimulation) of the primitive body mind unit

It springs from that common ground where psyche and soma are one, and its study belongs as much to psychology as to physiology The term "*psychosomatic*" should be reserved for symptoms so characterised

I wish to thank Dr R M B MacKenna for his criticism, help, and constant encouragement

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ACUTE DILATATION OF THE STOMACH AS A LATE COMPLICATION OF POLIOMYELITIS

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ACUTE dilatation of the stomach is sometimes seen after major abdominal operations, and occasionally during acute infections , or it may be caused by trauma to the vagus trunk (Collet's syndrome) In the following cases it occurred in poliomyelitis patients after months of treatment in respirators

THE FIRST CASE

A typist, aged 20, was admitted to hospital on Nov 9, 1949 After 5 days with muscular weakness and pain, and double vision

On admission she was pyrexial, apprehensive, and slightly confused. She had a convergent squint on looking to the left Most muscles seemed weak and atonic but there was no sensory loss A few hours later her breathing became distressed and she was placed in the Both respirator at pressures of −13 + 2 cm of water and a rate of 20 per min Fluids were restricted in an attempt to counteract œdema of the brain and spinal cord

Next day a facial spasm developed, but this disappeared when the pressure in the respirator was reduced to −16 The severity and extent of the paralysis increased and she was barely able to breathe out of the respirator The temperature fell to normal and remained so Her condition became progressively worse with cyanosis and bubbling respirations The respirator pressure was reduced to −18, oxygen was given, and within a few hours she improved

On Nov 12 she was much distressed outside the respirator and even with the McKesson *resuscitator she could stay out* no longer than 5–10 min During the night there was a sudden crisis , the pulse became rapid and feeble, and she was comatose The blood pressure was 180/120 mm Hg. Nikethamide (5 ml) was given intravenously, the oxygen mask was used, and she again recovered A brief examination of the chest suggested that the base of the left lung was collapsed

By Nov 16 spontaneous respiratory movements were absent and there was generalised paralysis below the neck. Passive movements and physiotherapy began on Nov. 18.

5 days later she still depended entirely on the respirator The chest was examined while the lungs were inflated with the Oxford inflator Breath sounds were absent over the left lung and only slight over the right apex and right mid zone

On Dec. 1 she was out of the respirator for 3 min., but she had no voice and became very blue Next day there was slight movement of right ankle and toes Spontaneous respiration was still absent The tidal air was measured at a respiration rate of 19 at different respirator pressures The spirometer readings were 300 c cm. at pressures of −16 + 4, 500 c cm at −22 + 5, and 500 c cm at −26 + 5. She was acutely uncomfortable with a negative pressure of 26.

No recovery of chest movement had taken place by Dec. 16 and no sounds were audible on auscultation , but the following week she was just able to move the fingers and wrist on the right side Very slight spontaneous respiratory movements were noticed on Dec 25, but they drew only a flicker from the spirometer

By Jan. 3, 1950, she could be encouraged to stay out of the respirator for 30 min. and hopes were raised that respiratory movement would return But it became clear that she was using only her accessory muscles of respiration. After 30 min. she felt very tired though her colour remained good. On this day she was transferred to the Drinker respirator

A troublesome urinary infection had developed her appetite became very poor and she began to lose weight By Jan. 13 she could breathe on her own for 35 min. On Jan. 20 the alkali reserve was 58·3 volumes of carbon dioxide per 100 ml. Her capacity steadily increased, and by Feb 27 she was able to dispense with the respirator for 4 hours at a time

Everything was done to try and occupy her mind but she was very apathetic. She lay in her bed for hours motionless, staring at the ceiling Mentally she became very unstable and she laughed and cried for no apparent reason.

Her general condition began to deteriorate rapidly The urinary infection persisted despite treatment She was obviously wasting away her hands became clawed her face pale and drawn, and her eyes prominent; but there was no cyanosis even when out of the respirator for hours. She led this dismal existence for many weeks.

In the afternoon of June 18 she vomited and complained of a lump in her chest. The respirator pressures were −18 + 4 Next day her general condition became worse and she had to be left in the respirator The pulse was very rapid but regular The outline of the dilated stomach was clearly visible through the abdominal wall. A tube was passed into the stomach and a considerable amount of gas and fluid evacuated. The swelling went down visibly but not completely An injection of carbachol (0·25 mg) was given In spite of this, there was obvious cyanosis and the pupils were widely dilated A second injection of carbachol (0·25 mg) was given an hour later and by now she had already had about a pint of saline by rectal drip The stomach contents were aspirated at short intervals. She went down hill rapidly and died about 5 hours after the onset of acute dilatation of the stomach.

There had apparently been before death a depression or paralysis of the cranial autonomic nervous system with enlarged pupils dry mouth tachycardia, and acute dilatation of the stomach The gastric distension further displaced the paralysed diaphragm and increased the pulmonary collapse causing greater cardiac embarrassment and cerebral anoxæmia.

A post-mortem examination was refused

THE SECOND CASE

A housewife aged 25 complained of malaise headache and pains in the limbs on July 26 1949 Admitted to hospital on July 29 she was pyrexial and unable to sit up; there was no neck rigidity but extensive patchy paralysis of various muscles below the neck Breathing was unhurried and clinically the lungs and heart were normal

The paralysis rapidly extended to the diaphragm and lower intercostal muscles and she was placed in the Drinker respirator at pressures of −17 + 4 and a rate of 20

Lumbar puncture drew a clear fluid at normal pressure Cells: lymphocytes 298 polymorphs 45 red cells 28 per c.mm. Protein 65 mg (globulin increased) glucose 60 mg and chlorides 740 mg., per 100 ml

Next day she was unable to stay out of the respirator Her temperature was 101 F and pulse rate 110

The paralysis increased still further but she was able to use the McKesson resuscitator for up to 20 min. while out of the respirator

Passive limb movements were begun on Aug 3 She ate and slept well and was apparently comfortable

Respirator pressures of −17 + 4 and a rate of 18 were used and the pressure was lowered to −24 for 5 min. every 6 hours. No diaphragmatic action was noted and, without the respirator breathing was mainly by the upper intercostals. On Sept. 17 she was out of the respirator for 20–30 min. with little discomfort. She was placed in the Stille shell type respirator during the afternoon and soon became anoxic, complained of headache and nausea and finally vomited Later that day she returned to the Drinker apparatus.

9 hours later she developed acute dilatation of the stomach. The stomach could be seen through the thin, lax abdominal wall, the greater curvature reaching well below the umbilicus. She vomited about 12 oz. of dark brown fluid. The pulse-rate went up to 96 and could not be lowered by pressure on the carotid sinus A tube was passed into the stomach large quantities of gas escaped and the stomach swelling went down. A rectal drip of normal saline was given, an intravenous drip being impracticable while she was in the respirator She improved considerably and was able to take fluids by mouth The stomach tube was removed on Sept. 20 but she remained in the respirator

2 days later the acute dilatation returned The same treatment was repeated, and in addition carbachol (0·25 mg) was given intramuscularly and the stomach tube was connected to a continuous suction pump Milder attacks of dilatation of the stomach recurred until Sept 29

After this episode she developed pitting œdema of the feet and there was a slight fall in the total plasma-proteins to 5·88 g per 100 ml. (albumin 4·6 g., globulin 1·28 g., per 100 ml)

With practice and encouragement she could manage on her own for longer and longer periods during the weeks which followed. On Oct 30 she was out of the Drinker for more than 3 hours. She complained of a burning pain in her right shin, and 0·1 g of procaine was given intravenously This caused considerable ' swimminess ' and in the evening she felt sick. There was considerable distension of the stomach which was relieved by eating charcoal biscuits

By the end of November she was able to breath on her own for as long as 7 hours at a stretch At this time the spontaneous tidal air was only 200 c.cm. with a respiratory rate of 20 Movement was returning to the left arm.

On Dec 14 she had a cold and could not come out of the Drinker at all She was unable to cough up phlegm She felt a tightness in her chest and complained of insufficient air even with pressures of −18 + 2. Soon she became cyanosed and a rapid examination suggested a collapse of the right lower lobe The spontaneous tidal air was only 150–200 c cm., and in the Drinker the tidal air was 300 c.cm. with a pressure of −17 + 0 After about an hour at this positive pressure she coughed up some mucus and felt easier the tidal air increased to 350 c.cm Later in the day acute dilatation of the stomach again became obvious A Ryle's tube was passed and about 40 ml of a highly acid fluid aspirated The pulse-rate was 100 with gallop rhythm and the temperature rose to 100·2°F She was given digoxin (0·5 mg) intravenously and oxygen. She vomited several times but gradually improved. On Jan. 27 1950 by which time she was out of the Drinker for 3–4 hours daily the alkali reserve was 50 volumes of carbon dioxide per 100 ml

She slowly recovered from this setback until on April 21 she was out of the Drinker for 17 hours. However her general condition had deteriorated considerably: there was no visible movement of the diaphragm or intercostal muscles; she was breathing mainly with her accessory muscles of respiration. Wasting was marked.

A new respirator—the Monaghan shell type—was tried but she was acutely uncomfortable and apprehensive in it In June she was able to sit in an easy chair for up to half an hour and spent only about 6 hours of the day in the Drinker

During the night of July 3 there was a recurrence of acute dilatation of the stomach with considerable abdominal discomfort, and scattered moist sounds in the lungs. She was again much relieved by the passage of a stomach tube Next day she complained of nausea and insufficient respirator pressure, and there was enormous dilatation of the stomach A nasal catheter was passed into the stomach and 1200 c cm of gas and 100 ml of bile-stained fluid were withdrawn. This tube was connected to a manometer and the pressure variations were synchronous with those of the respirator The gastric pressure was −5 to −6 cm. of water; the positive Drinker pressure was apparently not transmitted to the interior of the stomach. The stomach was emptied by continuous suction and two injections of neostigmine (1·25 mg) were given. A rectal drip of glucose saline was set up but her condition deteriorated rapidly Large quantities of bile-stained fluid were aspirated but the distension of the stomach waxed and waned. Two more injections of neostigmine (1·25 mg) gave only temporary relief She asked for more and more negative pressure and complained of severe thirst She became progressively weaker and died in the early hours of July 6

DISCUSSION

When a patient is in a respirator, the mechanical control of respiration replaces the delicate Hering Breuer reflex. Variations in the respiration rate cannot ake place in response to changes in the pH of the blood, and the acid-base equilibrium is disturbed The pulmonary ventilation is normally controlled by the rate of metabolism In our cases, the respiration-rate was maintained at 18–20 and the inspiratory volume was adjusted by finding the negative pressure which kept he patient comfortable In case 1, the initial negative pressure must have been inadequate, since the patient had a poor colour, the pulse-rate was 120 when her emperature was only 99 4°F, and the blood-pressure was 150/110 Facial spasms were also noticed When he pressure was reduced from −13 to −16 and oxygen was given, the facial spasm disappeared and the pulse-rate and blood-pressure began to come down The ause of the facial spasm is obscure Whenever this patient had severe respiratory distress the pulse rate and the blood-pressure rose steeply

Both our cases suffered from the delayed effects of oxygen lack—namely, depression, headache, nausea, and vomiting It is well to remember that these symptoms, of slight cerebral anoxia may not appear for 8–24 hours as in mountain sickness

To assess the degree of recovery of the diaphragm nd the intercostal muscles is not easy Various indirect means must be used which are based on measurements f pulmonary ventilation, and which include the contribution made by the accessory muscles of respiration

Anoxia is easily induced in the early stages and patients are unable to leave the respirator, even for a hort time When they are able to use the accessory muscles they can breathe independently, even though here may be little sign of recovery in the diaphragm nd the intercostal muscles The tissues probably ecome acclimatised to a poor oxygen supply especially ince their need for oxygen is reduced by the wasting, atty degeneration, and fibrosis of skeletal muscles However, the slightest upset, emotional or physical, or he most trivial infection, makes the patients feel unduly ired, their appetites become poor, and they must spend more time in the respirator Spontaneous respiration is inefficient because the pressure of the paralysed diaphragm collapses the bases of the lungs, and the ultimate fibrosis of the intercostal muscles produces a rigid thoracic cage t is probable, therefore, that respiratory movement is inadequate for oxygen needs, even at their reduced evel, when patients are out of the respirator

The normal tidal air is approximately 500 c cm and the dead-space air is about 150 c cm (Moncrieff 1935), the atter does not take part in the respiratory exchange so the effective volume of inspired air is 350 c cm In case 1 he tidal air was 300 c cm in the Both respirator, which means that the respiratory efficiency was about 43% of normal The second patient was able to remain out of he respirator for about 6 hours a day for months, and yet her spontaneous tidal air was only 200 c cm—a respiratory efficiency of approximately 15% In spite of a reduced need for oxygen, the acclimatisation of the issues, and an increased rate of breathing, she must have suffered from oxygen lack

It was impossible to increase the tidal air in the respirator because of the intolerable discomfort when the pressures were increased However, oxygen requirement can be calculated quite easily and in case 2, where most data are available, the calculation is as follows

Weight on admission	130 lb
Height	67 in
Surface area (from the nomograph of Boothby and Sandiford 1924)	1 69 sq m

Each litre of oxygen liberates 4 8 calories (respiratory quotient = 0 75)—i e, to liberate 1 calorie approximately 210 c cm. of oxygen s needed

Normal basal metabolic rate of a woman = 37 calories per sq m. per hour

total basal metabolism on admission = (1·69 × 37) = 62 5 calories per hour

Her ordinary mixed diet raised the metabolic rate by about 6 3 calories per hour the rate then becomes 68 8 calories per hour

calorie output per minute = 1 15

As each calorie requires an oxygen intake of 210 c.cm., oxygen consumption per min. = (1 15 × 210) c cm. = 242 c cm.

From every 100 c cm of inspired air, 5 c cm of oxygen is absorbed.

pulmonary ventilation required for a respiration rate of 18 =

$$\left(\frac{242}{5} \times 100 \times \frac{1}{18}\right) \text{c cm} = 270 \text{ c.cm}$$

The dead-space air was at least 150 c cm.

tidal air required = 420 c cm

A simplified formula for the tidal air while the patient is in the respirator is

$$\frac{70}{R}\left\{(S \times B) + 6\ 3\right\} + 150$$

R = respiration rate, S = surface area in sq m, B = basal metabolic rate per sq m. per hour (B = 40 in males and 37 in females)

The only logical method of determining whether a particular patient can safely leave the respirator is to measure the spontaneous tidal air, which must be roughly equal to the calculated value A method of determining the tidal air of patients in respirators is therefore necessary We have assumed that, in normal persons, 5 c cm of oxygen is absorbed from every 100 c cm of inspired air An analysis of the expired air is required to confirm this figure, but this was not done in case 2

In a normal person shortage of oxygen reflexly increases the rate of respiration This is obviously not possible in a respirator If the respirator rate is increased in order to reduce the volume of the tidal air, more carbon dioxide is eliminated, the alkali reserve rises, and the kidneys excrete a less acid urine If the rate is normal and the tidal air is too small, because of leakage or inadequate respirator pressures, then carbon dioxide accumulates, the alkali reserve is diminished, and the urine is more acid The alkali reserve may be used therefore as an index of adequate ventilation

In a patient with paralysis of the respiratory muscles a trivial infection is a major illness Even a slight cold produces secretions which cannot be coughed up and which, if inhaled, may cause collapse of the lungs and an even more acute shortage of oxygen The metabolic-rate rises with body-temperature (7% per °F) and a corresponding increase in pulmonary ventilation becomes necessary Slight degrees of oxygen lack remain masked for a long time, but when compensation breaks down dramatic symptoms appear after a latent period

The second patient had several attacks of acute dilatation of the stomach They were precipitated by acute respiratory distress, and always developed after a lapse of several hours When she was transferred from the Drinker to the Stille, she became anoxic and the following morning the acute dilatation of the stomach developed This delay suggests that cerebral anoxia may be the cause Later she had a cold and became cyanosed, probably because of aspiration of mucus and collapse of lungs The spontaneous tidal air decreased and after a few hours she again developed dilatation of stomach The final and fatal attack also began with a cold

The interesting features of the attacks were

(1) A tachycardia which was uninfluenced by pressure on the carotid sinus Stimulation of the carotid sinus at other times, and in other respirator patients, caused appreciable slowing of the pulse (2) Dilatation of the pupils (3) Dryness of the mouth and dysphagia. (4) The poor response to carbachol and neostigmine

These observations suggest a paralysis of the connector cells of the autonomic nervous system especially in the dorsal nucleus of the vagus and the exciter cells of the parasympathetic system in Auerbach's plexus Apparently this depression appears long after the initial anoxia A few hours after an intravenous injection of 0 1 g of procaine there was considerable distension of the stomach It therefore seems that cerebral anoxia (and procaine) had a depressing action on the small autonomic cells of the dorsal nucleus known as the nucleus intercalatus, and that the somatic innervation of the vagus was hardly affected

Bodechtel (1948) considered the possibility of nuclear atrophies as late sequelæ of poliomyelitis and Timko (1948) observed severe disorders of the sympathetic nervous system precipitated by the stress of pregnancy in an old case of poliomyelitis It seems likely that the virus of poliomyelitis may cause more damage to nerve-cells than is first apparent and that certain apparently intact cells become abnormally vulnerable to oxygen lack

SUMMARY

Two patients with poliomyelitis who had spent months in respirators developed acute dilatation of the stomach

The cause may lie in those nerve-cells which though apparently undamaged, may be abnormally sensitive to oxygen deficiency after the infection.

To avoid this danger the aim must be to provide an adequate pulmonary ventilation for respirator patients A method of calculating the tidal air required is suggested

My thanks are due to Dr W H. Kelleher physician superintendent, for enabling me to study these two cases. I should also like to pay tribute to the nursing staff for their unending devotion to helpless patients.

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MICRO METHOD FOR DETERMINATION OF URINARY α-KETOSTEROIDS AND β KETOSTEROIDS

BY DIGITONIN FRACTIONATION AND COLORIMETRIC ESTIMATION

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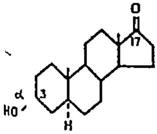
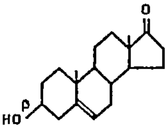
STEROIDS carrying a hydroxyl group on C 3 are of two types—3α hydroxysteroids and 3β hydroxysteroids. 3α hydroxysteroids (e.g androsterone) have the hydroxyl group on the opposite side of the ring system to the methyl group at C-10 and are not precipitated by digitonin in alcoholic solution. 3β hydroxysteroids (e.g dehydro-*iso* androsterone) have the hydroxyl group on the same side of the ring system as the methyl group at C-10 and are precipitated by digitonin



Androsterone.



Dehydro-iso-androsterone.

It is sometimes of value in diagnosis to know not only the total urinary output of 17 ketosteroids but also the quantities of the digitonin precipitable and digitonin non precipitable fractions, or β and α fractions (Butt et al. 1948) In normal urines the β fraction may contribute up to 15% (Butt et al. 1948) although it is usually less than 10% of the total. In certain pathological conditions the β/total ratio alters, notably in cases of adrenocortical carcinoma, when the β fraction may rise to as much as half the total In simple adrenal hyperplasia, on the other hand, when the total amount of 17 ketosteroids may also be much increased, the β/total ratio remains normal.

Most of the methods used for estimating the α and β fractions require much urine and are lengthy and tedious Butt et al. (1948) described a micro method using polarography to determine the two fractions Since most laboratories are not equipped with the necessary expensive apparatus for polarography we decided to modify this method substituting the Zimmermann (1935) colour reaction while keeping the method on a micro scale Results show that the method is reproducible within narrow limits and is of sufficient accuracy for clinical purposes.

It is well known that acid hydrolysis of urine as used in this work causes some destruction of 3β hydroxy steroids, with the result that the β/total ratio obtained in those circumstances is lower than it should be (see for example, Bitman and Cohen 1949 1951 and a review by Engel 1950) However, since there is at present no satisfactory method which hydrolyses all the urinary conjugates without causing further chemical change acid hydrolysis seems to be the only convenient method for routine use

EXPERIMENTAL

For the extraction of urine and for the colour reaction we use a method (given to us in 1947 by Dr A M. Robinson of St Bartholomew's Hospital, London and Dr F L Warren of University College London) which resembles in all essentials the method recently published by the M R.C Committee on Clinical Endocrinology (Medical Research Council 1951)

Ethanolic potassium hydroxide stabilised with ascorbic acid (Wilson and Carter 1947) is used for the colour reaction. All readings of optical densities are made on the Hilger Spekker absorptiometer using Ilford 604 and 601 filters. The colour correction equation of Talbot et al. (1942) is applied for all fractions from urine extracts. Readings are made against a reagent blank. The standard used is an ethanolic solution of dehydro *iso*-androsterone.

α-β SEPARATION PROCEDURE

Principle

The β-ketosteroids form with digitonin in ethanol complexes which with excess digitonin, are precipitated by ether The α ketosteroids remain free in the ethereal solution and can be separated The digitonin complexes are then decomposed by heating with dry pyridine On the addition of ether the digitonin from the complexes is precipitated and the liberated β ketosteroids remain in solution.

Our separation procedure follows closely that of Butt et al (1948) but certain practical points require further detailed description.

Reagents

Duncan's Anæsthetic Ether *B.P* has been used throughout. Analar pyridine is dried over barium oxide and distilled each batch being used for not more than ten days.

All ethanol must be aldehyde free to avoid interference in the final colour reaction Absolute ethyl alcohol (Distiller's Company Ltd., grade R.R.) may be used without further purification

Method

A sample of the ethanolic urine extract (or the ethanolic solution of pure steroid) containing at least 1 mg of ketosteroid (and not more than 0·5 mg of β fraction) is evaporated to dryness. A graduated glass-stoppered round bottomed (not conical) centrifuge tube is convenient. The residue is treated with digitonin and left in the refrigerator overnight as described by Butt et al. (1948)

Ether (10 ml.) is then added in small amounts with stirring to allow flocculation of digitonin and digitonides. It is important to allow enough time for complete flocculation, and the following standard procedure has been developed About 3 ml. of the ether is added in two portions with mixing; the tube is allowed to stand for twenty to thirty minutes with occasional stirring with a fine glass rod after which a further 4 or 5 ml. of ether is added The final 2 or 3 ml. of ether which is used to wash down the rod and sides of the tube, is added after a total period of 45 minutes.

The tube is then centrifuged the clear supernatant fluid decanted into a separating funnel, and the precipitate washed three times with ether as described by Butt et al (1948) If

TABLE I—COMPARISON OF RESULTS FOR TOTAL 17 KETO STEROIDS WITH 100 ML. AND 250 ML SAMPLES OF URINE USED FOR EXTRACTION

Specimen no	Total ketosteroids (mg per 24 hr)	
	250 ml extracted	100 ml extracted
1	7 7	8 9
	8 1	8 1
2	9 4	10 4
	10 2	10 2
3	13 6	13 2
	13 6	13 2
4	28 6	28 6
	32 5	28 1
5	5 8	5 7
	5 5	5 5
6	9 8	10 4
	—	11 0

the initial flocculation has been satisfactory, the washings can be carried out rapidly without standing If flocculation has not been satisfactory, some precipitate will appear in the separating funnel on standing, and washings will be troublesome, with cloudy supernatant fluid.

The combined ether extracts are washed in the separating funnel three times with water, and evaporated to dryness, giving the α fraction

The precipitate in the centrifuge tube (β digitonides and digitonin) is dried in air, and for a further fifteen to twenty min in a desiccator over calcium chloride, preferably under continuous evacuation. It is next heated with 0 25 ml of dry pyridine as described by Butt et al (1948) After cooling, 5 ml of ether is added as before in small amounts with stirring, and the tube is allowed to stand for about fifteen minutes before the final 2 ml is added The separated digitonin comes down as a fine and rather gelatinous flocculent precipitate

The mixture is centrifuged, and the clear supernatant fluid is decanted into a separating funnel A second pyridine-ether extraction is made immediately without drying the residue The precipitate is then washed twice with ether The combined pyridine ether extracts and washings are washed with sulphuric acid and water, and evaporated as described by Butt et al (1948) giving the β fraction The ethereal extracts are sometimes slightly opalescent, even when care is taken to allow the precipitate to flocculate, but this does not seem to interfere with the subsequent estimation.

The residues of α and β fractions are made up in ethanol (4 and 2 ml respectively), and these extracts are used in the Zimmermann colour reaction.

All or most of the coloured material in the urine extracts passes into the α fraction extract, the β fraction extract being usually colourless (occasionally blue or purple)

It has been stated above that for the α β separation procedure a sample containing 1–1 5 mg of ketosteroid is necessary Sometimes 100 ml of urine does not yield sufficient material, in these cases it is necessary either to combine the residues from the extraction of two or more 100 ml portions of urine, or to return to the original procedure of Robbie and Gibson (1943), in which 250 ml volumes of urine are extracted The latter was finally found to be the most convenient procedure The method was slightly modified in that we use a second 15 ml portion of carbon tetrachloride for washing out flask and separating funnel without filtering, and washings are made with 30 ml quantities of water and sodium hydroxide A series of parallel estimations (table I) showed that there was no significant difference in the total ketosteroids estimated in 100 and in 250 ml volumes of urine

RESULTS

Recovery Experiments

Experiments were first made with pure solutions of androsterone (α fraction) and dehydro *iso*-androsterone (β fraction) Miscellaneous twenty four-hour urine specimens were next examined, to samples of which androsterone and/or dehydro *iso* androsterone were added The results are summarised in table II (series A and C) During the course of these tests minor modifications in technique were made both in urine extraction and in separation procedure The method as finally standardised is described above, this method was followed in a second series of experiments on pure solutions, and further urine specimens with recoveries (table II, series B and D)

Recoveries of the β fraction from pure solutions we all high (105–115% of the quantity added, mean 110% (table II, series A and B) Recoveries of androstero and dehydro *iso* androsterone from urine (table series C and D) were satisfactory Analysis of uri extracts (table III) shows that the sum of α and β fractio estimated separately compares reasonably well with t value for total 17-ketosteroids (90–110% of the total)

Normal Urine

To obtain a short series of normal values for t method, the separation procedure was carried out twenty four hour urine collections obtained from healthy adults (5 men and 5 women laboratory sta (table III, series E)

The β fraction varied between 1% and 19% of t (α+β)-17-ketosteroids Butt et al (1948) found a ran of up to 15% β fraction In 3 cases we examined tw *twenty-four-hour urine specimens from the same perso* The values obtained for the β fraction as a percenta of (α + β) were 3 and 4, 13 and 15, and 17 and 19

Duplicate α β separations on a single extract a duplicate extractions on the same urine specimen sho good agreement, except in 2 cases All duplicate valu fell between ±5% of their mean, and the majority f within a much smaller range

TABLE II—DETERMINATION OF α and β KETOSTEROIDS IN PU SOLUTIONS AND ADDED TO URINE

The α and β ketosteroids used were androsterone a dehydro *iso* androsterone The steroids were added to ur after it had been heated alone with acid and before reflux with carbon tetrachloride Results for recoveries from pu solutions are expressed as mg ketosteroid, results f recoveries from urines as mg ketosteroid per 100 ml of ur

SUMMARY OF RESULTS

Series	Recovery from	No of expts	Steroid originally present (mg)		Steroid added (mg)		Steroid recovered (% of add material)	
			α	β	α	β	α	β
A	Pure solutions	13	0	0	0 25–1 03	0 11–0 28	86–118	107-114
B	,,	6	0	0	0 52–1 04	0 10–0 52	99–102	106-115
C	Urinary extracts	6	0 30–0 74	0 01–0 06	0 22–0 51	0 22–0 56	82–115	77-114
D	,,	3	1 19	0 05	0–0 52	0–0 31	89–102	94-106

DETAILS OF EXPERIMENTS IN SERIES D

Urinary extracts contained 1 19 mg of α fraction an 0 05 mg of β fraction per 100 ml of urine

Expt.	α fraction			β fraction		
	Added (mg per 100 ml)	Recovered (mg per 100 ml)	Recovered (% of added)	Added (mg per 100 ml.)	Recovered (mg per 100 ml)	Recovered (% of added)
D1	0 52	0 46 0 52	89 100	0		
D2	0			0 31	0 33 0 29	106 94
D3	0 52	0 51 0 53	98 102	0 31	0 30 0 30	97 97

TABLE III—URINARY EXCRETION OF TOTAL, α AND β 17 KETOSTEROIDS IN NORMAL ADULTS AND PATIENTS

Fractionation of α and β ketosteroids was carried out on extracts of 250 ml of urine in nearly all cases. The quantity of ketosteroid fractionated was 0·7–1 8 mg ; (a) (b) and (c) indicate different twenty four hour collections from the same person.

Subject no, sex, and age (yr)	Ketosteroids (mg per 24 hr)				
	Total	α	β	β (% of α+β)	α+β (% of total)
Series E normal adults					
1 F 23	10·3	10·3	1·0	9	110
		10·5	1·0	9	112
2 F 32	10·7	10·1	0·1	1	90
		10·2	0·1	1	97
	11·0	10·2	0·1	1	93
3 F 30	7·2	6·4	0·2	3	92
	7·2	6·4	0·2	3	92
4 F 32	5·9	5·7	0·1	2	98
	5·9	6·0	0·1	2	102
5 F 26	(a) 12·2	9·5	1·8	16	93
	12·0	9·7	2·0	17	98
	(b) 14·4		2·6	18	
	14·4	11·8	2·8	19	101
6, M, 28	(a) 17·7	18·4	0·5	3	107
		18·4	0·5	3	107
	18·8	18·0	0·5	3	102
	18·9	19·2	0·5	3	104
	(b) 19·3	17·5	1·2	6	97
	18·7	18·2	0·3	2	99
7 M, 38	(a) 8·7	8·2	1·2	13	108
	10·4	8·2	1·2	13	90
	(b) 9·9	8·0	1·4	15	95
	10·1	7·8	1·4	15	91
8, M, 42	14·1	12·6	0·2	2	91
	13·0	12·2	0·2	2	95
9 M, 31	10·7	9·3	0·3	3	90
	9·8	9·6	0·3	3	101
10 M, 27	16·3	15·4	1·1	7	101
	16·0	14·9	1·1	7	96
Series F patients:					
11 M, 19	(a) 4·9	5·0	0·3	6	106
		5·0	0·2	4	104
	(b) 8·3	7·5	0·8	10	100
	(c) 6·8	6·8	0·7	9	110
	6·9	6·8	0·7	9	109
12, F 25	24·2	20·9	5·8	22	110
		20·9	6·3	23	112
13 F 31	(a) 168	106	69·1	40	104
		103	60·0	37	97
		102	61·2	38	97
	(b) 301	192	93·6	33	95
		189	104	35	98
	(c) 119	104	27·8	21	109
		101	22·0	18	103
14, M, 17	(a) 13·6	10·2	3·1	23	98
	(b) 20·4	14·9	4·8	24	97
	19·2	13·9	4·6	25	96
15 F 28	(a) 45·8	41·1	6·2	13	103
	45·4	41·6	6·7	14	106
	47·8	42·6	6·5	13	103
	47·7	40·5	6·5	14	99
	(b) 18·0	16·8	1·0	5	94
	17·0	16·5	1·1	6	104

11 Hypogonadism Ectopic testis ; (a) and (b) base-line specimens (c) during treatment with gonadotropin.
12. Hirsutes.
13. Adrenocortical carcinoma ; (c) immediately before death.
14 Malignant teratoma of testis (a) before operation ; (b) after operation, receiving radiotherapy
15. Cushing's syndrome ; (a) before (b) shortly after unilateral adrenalectomy

Pathological Urine

A few representative results with pathological urine are given in table III series F which includes three specimens from a woman with adrenal carcinoma (case 13) which show the expected very high ratio of β/(α+β), and two specimens from a woman with Cushing's syndrome (case 15) which show 14% of β fraction before and 6% of β fraction shortly after unilateral adrenalectomy

Stability of 17 ketosteroids

The stability of 17 ketosteroids both in urine specimens and in ethanolic extracts over six months storage in a refrigerator has been studied. The urine examined was a forty-eight hour collection of about 4 litres from a normal adult female aged 30 to which 20 ml. of concentrated hydrochloric acid had been added as preservative Extractions and colour reactions were done at intervals during the six months, and the results showed that there was no significant trend in the ketosteroid content during this period The following values are all in mg of total ketosteroid per 100 ml of urine mean 0 38 range 0 32–0 43 standard deviation 0 026 first result urine extracted on day of collection and colour reaction done next day 0 41 ; last result, urine extracted on 176th day and colour reaction done on 177th day after collection, 0 37

Vestergaard (1951) has given data showing that ketosteroids are stable for a month in urine kept at room temperature and without preservative.

Experimental Error in Extraction Procedure and Colour Reaction

The results obtained in the experiment on the stability of 17 ketosteroids were also used to measure the reproducibility of the extraction procedure and the colour reaction for total 17 ketosteroids The extraction was done on 15 different occasions in duplicate. The colour reaction was done on each of these extracts on one or more occasions in duplicate, giving a total of 76 pairs of colour reaction duplicates.

All the results are expressed as mg of ketosteroid per 100 ml. grand mean, 0·38 The results for the 76 pairs of colour reaction duplicates gave the following differences between duplicates 0·00 (25 cases) 0 01 (31 cases) 0 02 (16 cases) 0·03 (3 cases) 0 04 (1 case) S.D of differences between duplicates, 0·013

The results for the 15 pairs of extractions gave the following differences between duplicates (in mg per 100 ml. as above) 0 00 (6 cases) 0 01 (5 cases) 0 02 (2 cases) 0 03–0·05 (2 cases) S D of differences between duplicates 0·020

DISCUSSION

When mixtures of α ketosteroids and β ketosteroids in pure solutions are separated by this method, the β-fraction results tend to be high (about 110% of the added material) In recovery experiments from urine, however there is good agreement between the sum of the α and β fractions and the total ketosteroid estimated separately

A major factor limiting the accuracy of the method is probably the colour reaction The figures given above provide some measure of the experimental error of this reaction in our hands.

Several points require consideration :

The colour produced in the Zimmermann reaction is approximately proportional to the concentration of ketosteroid up to about 0·1 mg (cf Medical Research Council 1951) It is our practice to check this with each series of reactions by setting up two standards, one twice the concentration of the other (containing about 0·05 and 0·1 mg of dehydro *iso*-androsterone) The extinction values per mg of ketosteroid for the two standards usually agree within ±2% of a calculated average figure, which is used in working out results. However experiments using a series of standards have shown that proportionality is not always exact, especially in the lower ranges ; this might explain an error up to 10%

probably in the direction of overestimation, when a very small β fraction ($<0\ 02$ mg) is measured by comparison with a relatively high standard The error involved in using the absorptiometer in these low ranges (extinction values 0 03 or less) is appreciable and may contribute to this Further, the colour produced in the reaction is not constant, even under standard conditions The extinction for a given amount of steroid varies from one series to another, and within one series, even with careful handling, there are often some differences between duplicate solutions, (about ±2% of the extinction values) Lastly, it is known that the colour-correction equation (Talbot et al 1942) is an approximation and may not apply equally to α and β extracts

In addition to errors which may arise from variation in the colour reaction blank, errors may occur due to colour contributed by reagents used in the digitonin separation The ether used must be free from peroxides, which contribute colour in the reaction. Anæsthetic ether, as specified by *Butt et al* (1948), gives a slight positive iodine reaction for peroxides, and we have not been able to purify the ether so as to lessen this. A "full method blank"—i e, a blank taken through the separation procedure, using ethanol in place of an extract, which would normally contain about 1 mg ketosteroid—gives colours in the α and β fractions equivalent, on the average, to 0·02 mg of ketosteroid, this would explain in part the apparent recoveries of over 100% of β fraction. However, such a "full method blank" adds considerably to the work of the separation procedure, and involves an increase in the number of tubes to be handled in each colour-reaction series, the errors due to delay in handling a large number of tubes might well outweigh the error of dispensing with the blank It was therefore decided not to use a full method blank.

The separation method described here is adequate for clinical purposes, in spite of the shortcomings described above The separate estimation of the β fraction (rather than an estimation of the total ketosteroid and α fraction, the β fraction being found by difference) provides a useful check on the accuracy of the work

SUMMARY

A micro-method, based on that of Butt et al (1948), is described for the separation of urinary 17-ketosteroids into α and β fractions, using digitonin precipitation, and their estimation by the Zimmermann colour reaction

The method is sufficiently reproducible and accurate for clinical purposes The sum of the values for α and β fractions agrees with the value obtained for total 17-ketosteroids within ±10%

Recoveries of androsterone (α fraction) and dehydro-*iso*-androsterone (β fraction) from pure solutions and from urine are satisfactory, but the β-fraction recoveries tend to be high (up to 110% of material added)

In a study of 10 normal adults the β fraction varied between 1% and 19% of the total 17 ketosteroids

The stability of total 17 ketosteroids in urine and ethanol extracts has been followed during six months There seems to be no significant loss From these results the variations between duplicate determinations have been recorded

We are indebted to British Drug Houses Ltd for a gift of dehydro *iso*-androsterone, and to N V Organon, Oss, Netherlands, for a gift of androsterone

ADDENDUM

After this paper had been submitted for publication, Cook (1952) described a similar method for fractionation of α and β ketosteroids followed by colorimetric estimation

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PREVENTION OF INFECTION OF THORACIC SURGICAL WOUNDS BY STAPHYLOCOCCI FROM THE PATIENT'S SKIN

WITH A NOTE ON THE INFECTION OF GLOVES

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FOR three years before the start of this investigation there had been a troublesome incidence of wound infections following thoracoplasty For example, from August, 1947, to August, 1948, there were 9 such infections in 69 consecutive cases These infections appeared within seven days of operation and affected the stitch line, wound, or Semb's space They were usually staphylococcal and unmixed, and 21 cases in which the bacteria were identified yielded *Staph aureus* (16 cases), *Staph albus* (3 cases), *Corynebacterium acnes* (1 case), and *Strep viridans* (1 case) The cumulative evidence of bacteriological surveys indicated that the infections probably arose from an autogenous skin source

DISINFECTION OF SKIN

The preoperative preparation of the skin during the early period was done with 1 1000 acriflavine in spirit Subsequent bench tests disclosed the disconcerting fact that six different strains of *Staph aureus* selected at random all survived 16 minutes' in-vitro exposure to 1 1000 aqueous acriflavine, and that three of these survived two hours' exposure The skin disinfectant in the next 23 cases was therefore altered to 2% iodine and thereafter to 1% iodine in 70% ethyl alcohol (Gardner and Seddon 1946, Gardner 1948) On the operating table the wound area was swabbed three times with iodine solution, all preoperative ward preparation was discontinued unless skin pustules were present This change led to a dramatic improvement, for the next 433 major thoracic operations were followed by only 16 staphylococcal wound infections (no Semb's space infections), a significant fall to about a quarter of the previous incidence

CLASSIFICATION OF INFECTIONS

The whole investigation was controlled by phage typing, which permitted classification of the 16 infections into the categories shown in table I, where the absence of "glove" infections should be particularly noted. Phage typing also established that the four skin autogenous infections arose through inadequacy of the skin disinfection, for in each case the infecting organism was also present in the routine swab of the wound edge taken at operation just before stitching up The 3 cross infections yielded staphylococci of the phage type identical with those recovered from the wound and skin pustules of a skin autogenously infected 3rd stage thoracoplasty All 16 of the infections resolved under chemotherapy although 15 of the 16 staphylococci were highly resistant to penicillin

TABLE I—CLASSIFICATION OF INFECTIONS DUE TO *Staph aureus*

	No of cases
True skin autogenous	4
Cross infection (from true skin autogenous)	3
Other autogenous*	3
Carrier (nose or throat)	4
Accidental exposure	1
Unknown	1
Surgeons' hands or gloves	0
Total	16

* Infected sinus (2 cases) and bronchopleural fistula (1 case)

GLOVE PUNCTURE AS A SOURCE OF INFECTION

The importance of glove puncture as a source of surgical infection has been proved by Devenish and Miles (1939) so we arranged to test this factor Swabs were taken from the surgeon's palms and fingers or from the interior of his gloves, immediately after the completion of each operation First, we examined both the type of organism found (if any) and its relation to any subsequent infection of the wound, and secondly we experimented with various glove treatments. The general results obtained with the gloves are summarised in table II, which shows that dipping the terminal phalanges into iodine immediately before donning the gloves is an excellent method of reducing infectivity of glove interiors during operation. The method of applying the iodine is as follows: the hands are scrubbed and dried; the terminal phalanges are dipped in 1% iodine in 70% ethyl alcohol the gown is put on the fingers are dipped again and the gloves put on over the moist iodine.

TABLE II—MAINTENANCE OF HAND AND GLOVE STERILITY

Hand	Glove	No of tests	Sterile	Coagulase-positive staphylococci	Various* other micro organisms
No antiseptic	Dry	47	11 (23 4%)	17 (36%)	19 (40 5%)
Antiseptic 1	Wet	5	3 (60 0%)	1 (20%)	1 (0·0%)
Antiseptic 2	Wet	5	1 (20 0%)	0	4 (80 0%)
1% iodine dip	Moist	81	68 (84 0%)	3 (3 7%)	10 (*Staph albus*)(12 3%)

* Coliform, *Pseudomonas pyocyanea*, *B subtilis* *diphtheroids* *Micrococcus tetragenus* *Staph albus*

The strains of staphylococci isolated from the hands or the gloves never showed any relation to those found in the postoperative infected wounds. The only possible glove infection in our series is the single "unknown" of table I However, since we simultaneously altered two variables in our investigation (skin disinfectant and glove treatment) it is impossible to say which of these is, or whether both are responsible for the substantial reduction in wound infections There may have been glove infections in the acriflavine series; but we believe that the general evidence points to the skin disinfectant as the major factor in this reduction

SUMMARY

A series of troublesome postoperative staphylococcal wound infections affecting 10–15% of cases during three years were diagnosed as probably originating mainly from an autogenous skin source, because extensive bacteriological tests of other possible factors almost invariably yielded negative results.

The skin disinfectant was therefore changed from acriflavine (only sluggishly effective against staphylococci) to 1% iodine in 70% ethyl alcohol This led to an immediate decrease in the number of infections to 3 7% (16 infections in 433 consecutive cases)

Dipping the fingers in iodine before donning surgical gloves is a valuable method of reducing potential infectiousness in the event of accidental glove puncture.

We wish to thank Drs. R. M. Fry V D Allison, and R. E O Williams for the phage typing; Drs. A. M. McFarlan and D M. Lidwell for certain ancillary bacteriological and ventilation tests in the theatre; and Mr F Boot F.I.M.L.T., and Miss E. Wilson, B.SC for assisting with the routine bacteriological tests.

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ISLET-CELL TUMOUR OF PANCREAS

REPORT OF A CASE

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Islet-cell tumours of the pancreas are of interest by reason of the symptoms which are bizarre and often misleading and the surgical treatment in which dexterous handling is rewarded by a dramatic cure To the research worker they are also of interest in giving opportunities for physiological and pharmacological investigation on the metabolism of carbohydrate In this paper is recorded a case which in all these respects proved rewarding

CASE RECORD

A man, aged 40 had two and a half years history of "blackouts." His illness began with an attack of sudden blindness in November 1948 when his routine meal times were altered. A cup of sweet tea revived him and his sight returned. Several weeks later he set off from Scotland to attend a meeting in Leeds. He was missing for two weeks and when eventually found by the police had lost his memory He had a further attack on the train while returning home. From this time onwards he was subject to periodic emotional outbursts, for which he sought psychiatric treatment, but without effect, and to further blackouts which he learned to forestall and minimise by taking bread and jam every two hours

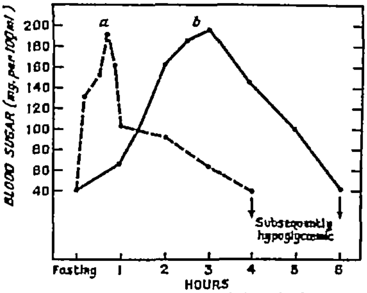

Fig 1—Glucose-tolerance tests: *a* on admission; *b* after standardisation on high-protein diet and before operation (cf. fig 7)

In 1949 the attacks recurred and the patient was sent to hospital for investigation as a case of epilepsy but again no satisfactory diagnosis was made and he resorted to his former treatment with bread and jam To facilitate this he went into hotel service with his wife In April 1950 the attacks recurred when he took a job as a labourer on the boiler plant of a hospital He had often to leave his work because of imminent blackouts, and his workmates accused him of malingering

By November 1950 the attacks had increased greatly in frequency and severity and the patient was often found semi comatose in the street outside his home Finally towards the end of 1950 he had an epileptiform seizure followed by

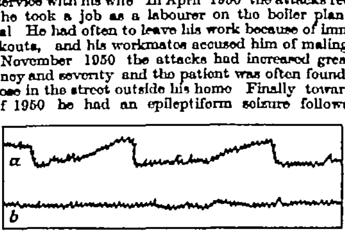

Fig 2—Gastrograms: *a* in hypoglycæmic phase; *b* in normoglycæmic phase.

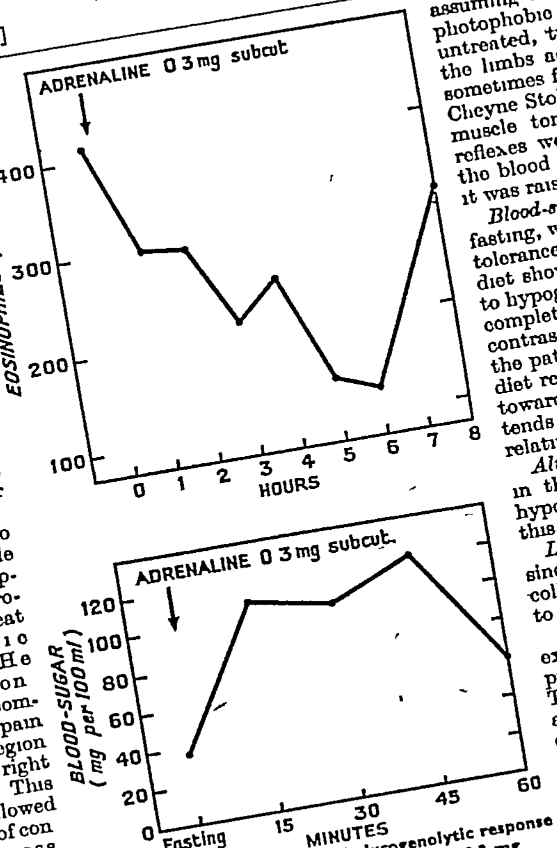

Fig 3—Eosinophil response and glycogenolytic response to subcutaneous injection of adrenaline 0·3 mg

unconsciousness for twelve hours He recovered spontaneously, but his memory has been noticeably impaired since His wife describes how, at this stage in his illness, she learned to detect the imminence of an attack by a change in his character from a normally placid to an irascible person capable of producing great domestic strife He would constantly complain of pain in the region of the right temple This was followed by loss of consciousness, which was accompanied by a wild staring expression, slow sighing breathing, deterioration of memory, profuse perspiration, and twitching Occasionally he would have a convulsion, often with incontinence of urine On recovery he often passed through a phase of highly emotional conduct, in which he would weep copiously or chatter excitedly He had no recollection of anything that he did at this time He was admitted to the psychiatric unit at Killearn Hospital, where his blood sugar level in an attack was 32 mg per 100 ml and a tentative diagnosis of islet cell tumour of the pancreas was made He was accordingly transferred for further investigation with a view to surgical treatment

Physical Examination—While he was normoglycæmic, the patient was a coöperative, if somewhat facile, well built man with no abdominal abnormality, but when he tended towards the hypoglycæmic there was noteworthy difficulty in commanding his attention His response to the "serial sevens" test was as follows 100, 93, 86, 89, 82, 76 70, &c He appeared to tire, and agreed readily with every thing that was put to him. Further, his demeanour was childishly facile on most occasions Alternatively, he would become exceedingly restless, often assuming the posture of cerebral irritation, curled up in bed, photophobic and uncoöperative He would then, if left untreated, twitch slightly as a preface to wild thrashing of the limbs accompanied by slow stertorous breathing, which sometimes fell to a rate of about 9 a minute, when it became Cheyne Stokes in type There was a striking increase of muscle tone, and reflexes were exaggerated, the plantar reflexes were extensor A labile hypertension was present, the blood pressure varying from 210/110 to 165/95 mm. Hg; it was raised during and after an attack.

Blood-sugar levels on five occasions, while the patient was fasting, were 32, 39, 34, 38, and 34 mg per 100 ml A glucose tolerance test done before standardisation of the patient's diet showed a rapid initial hyperglycæmia, followed by a fall to hypoglycæmic levels in the 4th hour The patient could not complete the 6-hr test because of hypoglycæmia. This contrasts strongly with a glucose tolerance test done after the patient had been for a week on the standard high protein diet recommended by Conn (1947), in which greater stability towards sugar is shown. Further, the blood-sugar curve now tends towards a mild plateau type (fig 1), the commonest relative finding for islet-cell tumours (Aird 1950)

Alimentary Tract—Gastric motility showed poor activity in the normoglycæmic state and increased activity in the hypoglycæmic state (fig 2) Screening with barium confirmed this finding

Liver—A hepatic origin of the hypoglycæmia was unlikely since the van den Bergh, cephalin flocculation, and colloidal gold tests were negative The glycogenolytic response to adrenaline gave normal results (fig 3)

Pituitary and Adrenal Glands—Lesions of these glands were excluded by the subcutaneous injection of adrenaline, which produced a normal reduction in the eosinophil count (fig 3) The average reduction of eosinophils after a hypoglycæmic attack was 30%, a smaller effect than would have been expected in view of the effect of the subcutaneous injection of adrenaline, if it is assumed that each hypoglycæmic attack caused a discharge of adrenaline into the circulation However, cortisone itself did not produce more than a 30% reduction in this patient Radiography of the sella turcica and examination of the visual field also disclosed no abnormality of the pituitary gland Straight radiography of the abdomen and intravenous pyelography did not reveal a lesion of the adrenals

Thyroid—The basal metabolic rate was +5%, which suggested that the thyroid was not a cause of the hypoglycæmia.

Renal glycosuria was excluded by finding a renal threshold for glucose of 178–194 mg per 100 ml

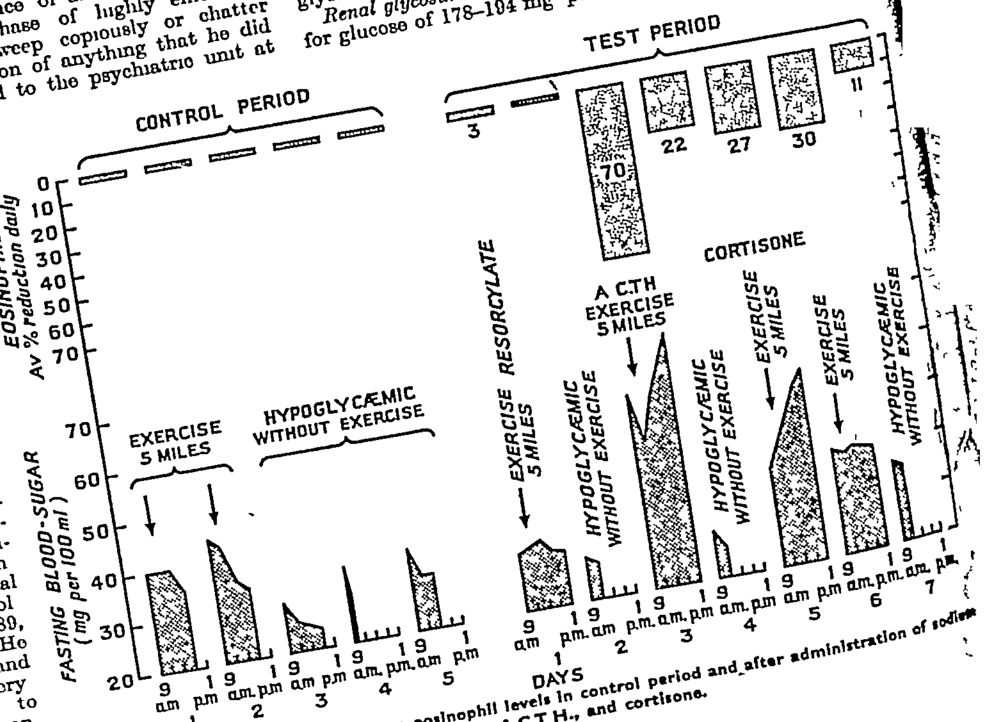

Fig 4—Fasting blood-sugar and average eosinophil levels in control period and after administration of sodium γ-resorcylate, A.C.T H., and cortisone.

Electro-encephalography in the hypoglycæmic phase showed a well marked dysrhythmia, consisting of irregular slow activity which was sometimes paroxysmal This was thought to be typical of grand mal epilepsy but after the administration of glucose the abnormality disappeared entirely

Acid-base Balance —Studies were made of the carbon dioxide level of the plasma and the plasma pH, before and during a hypoglycæmic attack. The carbon dioxide level of the plasma fell from 43 5 vols.% in the normoglycæmic phase to 26·6 vols.% in the hypoglycæmic phase and the plasma pH showed an average shift of 0·21 toward acidæmia.

Gastric secretion was measured in both the normoglycæmic and hypoglycæmic phases, and was notably increased in the latter (see accompanying table)

Urinary excretion of 17 ketosteroids was at the upper limit of normal, average figures being 22 mg in a 24 hr specimen of urine. The patient had gained weight within recent years but there was no suggestion of obesity of the pituitary type and the gain in weight was probably due to the lipogenetic effect of insulin and the higher carbohydrate intake There was a hyperpiesis, but this was of the labile type and may have been simply due to repeated release of adrenaline. It is readily deduced from these results that the evidence for repeated activation of the adrenal cortex with resultant liberation of salt-active, sugar-active and androgenic steroids was not marked.

Effects of A.C.T.H , Cortisone and Sodium γ resorcylate —The patient was kept on a standard diet containing carbohydrate 300 g., protein 100 g and fat 80 g and he was given such quantities of glucose in measured amounts as were necessary to rescue him from hypoglycæmia In a preliminary study, he was exercised for five miles on a static training bicycle and observed from 9 A.M to 1 P.M after an overnight fast. On several occasions the fasting alone precipitated hypoglycæmia. Blood-sugar estimations were made until the patient was on the verge of hypoglycæmia, which was usually recognised by incoördination slow sighing respiration, and dysarthria. Sometimes much restlessness and emotional changes were seen at this stage Hypoglycæmia supervened on each of the control days, before expiry of the observation period. Preliminary eosinophil-counts were made before the onset of coma. In the test period the patient was again exercised for five miles on the bicycle if necessary Sodium γ *resorcylate* 100 mg was given at 6 P.M , 200 mg at midnight and 300 mg at 7 A.M. immediately preceding the first test. The patient did five miles on the bicycle but the fasting blood-sugar level was not significantly raised, and the eosinophils remained at a high level (fig 4) There was no evidence of glycosuria. Next day the patient readily became hypoglycæmic without exercise A.C.T.H. 25 mg was given at 6 P.M., 50 mg at midnight, and 50 mg at 7 A.M. immediately preceding the second test The patient did five miles on the bicycle with no evidence of incoördination and remained symptom-free until the end of this test The blood-sugar level rose above all previously recorded fasting levels in this patient there was glycosuria in the 24 hr specimen of urine and the eosinophil-counts showed a significant reduction. Next day the patient returned to the state originally observed in that an overnight fast without exercise produced hypoglycæmia *Cortisone acetate* 100 mg was given at 6 P.M. 100 mg at midnight, and 100 mg at 6 30 A.M immediately preceding the third test The patient did five miles on the bicycle with no evidence of incoördination, and remained symptom free till the end of this test. Next day he was again symptom free before and after exercise On both days of the second and third tests there was a rise in blood sugar levels which, again, was increased somewhat by exercise. The reduction in eosinophils was less with cortisone than with A.C.T.H. but persisted for two days, and there was marked glycosuria in the 24 hr specimen of urine On the final day of these experiments the patient returned to the state in which fasting without exercise provoked hypoglycæmia

GASTRIC SECRETION IN RELATION TO BLOOD SUGAR LEVELS

Time (min)	Blood-sugar	Free HCl (ml N/10 HCl %)	Volume (ml)
0	Normoglycæmic	40	60
30		38	36
60		28	26
90	Hypoglycæmic	30	29
120		88	60
150		96	40

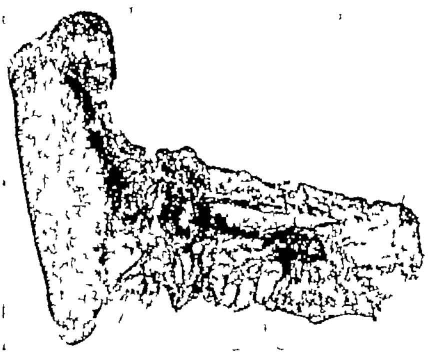

Fig 5—Operation specimen, posterior aspect, showing pale zone of tumour tissue on section.

Operation (Prof. C F W Illingworth) —In preparation for operation the patient was given a high protein diet and an intravenous transfusion of protein hydrolysate During the operation a saline infusion was given, to which had been added 50 ml of 20% glucose Through a left paramedian incision in the upper abdomen, the anterior wall of the body of the pancreas was first exposed by division of the gastrocolic ligament. On inspection the body of the pancreas appeared entirely normal but palpation revealed within the pancreas a firm almost hard lump about 1 in in diameter situated some three inches from the tail of the pancreas The spleen and the tail and body of the pancreas were mobilised to expose the tumour from behind. On this aspect the tumour was readily visible as a rather white nodule embedded in and infiltrating the pancreas. *Exploration of the remainder of the pancreas* after full mobilisation revealed no further nodules. Since excision of the tumour with an adequate zone of healthy tissue would inevitably mean division of the pancreatic duct it was decided to remove the whole body and tail of the pancreas. The spleen was necessarily removed too The pancreas was divided about 1 cm to the right of the tumour and about the same distance to the left of the superior mesenteric vein.

Pathological examination (Dr J R Anderson) of the operation specimen (fig 5) revealed a solid tumour with a pale yellow cut surface the margin was irregular strands of tumour tissue extending into the adjacent pancreas. No abnormality was noted in the pancreatic tissue in general Microscopy showed the tumour to be composed of clusters of

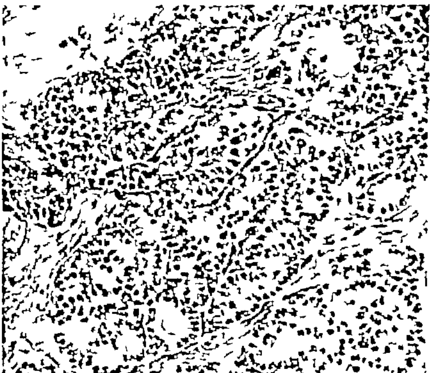

Fig 6—Islet-cell tumour of pancreas. (Hæmatoxylin and eosin) (×125.)

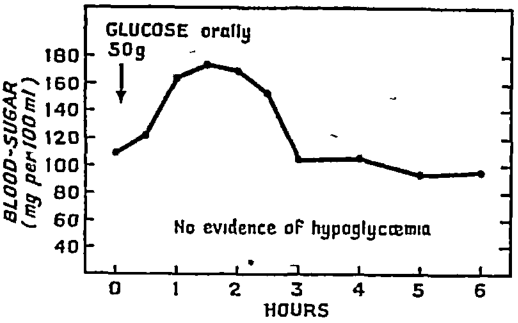

Fig 7—Glucose-tolerance test fourteen days after operation (cf fig 1)

epithelial cells which were mainly columnar and tended to be arranged radially, giving rise to duct like structures some of which possess a small lumen Occasional mitoses were seen, and at the margin the tumour was not everywhere sharply encapsulated, in places the tumour tissue extended between the adjacent pancreatic lobules, and the appearances were those of islet cell tumour belonging to the group of "border line malignancy" (fig 6)

The insulin content of the tumour was determined in the department of biochemistry of the University of Glasgow by biological assay The tumour contained 14 units per g of tissue (normal pancreatic tissue contains 2 or 3 units per g)

Postoperative Progress—The patient made an uneventful recovery apart from hyperglycæmia, glycosuria, and a mild ketonuria on the 2nd–4th postoperative days. The post operative glucose tolerance curve was of mild diabetic type two weeks after operation (fig 7), and the insulin tolerance had considerably increased (fig 8) Further restoration towards normal had taken place by the time of the patient's discharge on the 14th postoperative day (fig 9), when his memory had improved and his performance on the "serial sevens" test was rapid and accurate.

DISCUSSION

The diversity of symptoms produced by islet cell tumours of the pancreas masks the essential characteristics of the condition Patients with such tumours may be mistaken for psychoneurotics, epileptics, malingerers, or patients with organic nervous disease With increased awareness of the condition and advances in diagnosis it is possible to differentiate hypoglycæmia due to over-secretory activity of the islet cell tissue of the pancreas from hypoglycæmia due to other causes Though an islet cell tumour usually produces severe symptoms, the symptoms are occasionally so mild that it may be difficult to avoid confusion with the clinical picture of reactive hyperinsulinism (Prunty 1944) In the latter condition, the fasting blood-sugar level is not necessarily very low (about 70–85 mg per 100 ml), the blood sugar level is initially raised by consuming a carbohydrate meal, and the early hyperglycæmia provokes a further secretion, which in turn aggravates the hypoglycæmic tendency of the patient The symptoms are further controlled by minimising the carbohydrate intake of the patient Confusion may arise because, in a case of islet cell tumour, repeated severe hypoglycæmia requires administration of large amounts of carbohydrate, further secretion of insulin from the pancreas is provoked, and the patient ultimately has a succession of severe attacks With the knowledge that the lesion may be malignant or quasi-malignant, all such cases of hyperinsulinism should be submitted to an exploratory operation, and it seems, in view of the difficulty in assessing the malignancy of the lesion, that local resection of the pancreas is preferable to simple enucleation It should be noted, however, that the locally infiltrative lesion is not malignant in the sense that it gives rise to metastases, indeed, it may owe its histological appearances to its rapid growth and functional activity If a malignant lesion is present, the prognosis is bad, in spite of the use of alloxan, which is dangerous because of its nephrotoxic action

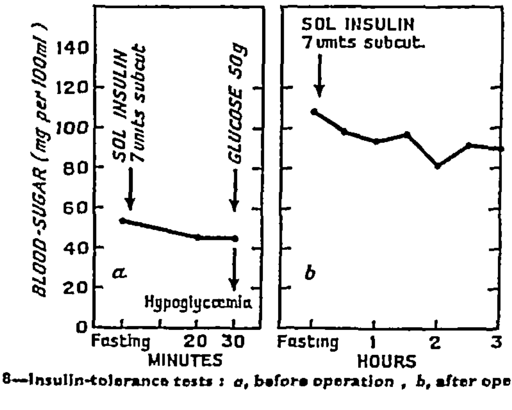

Fig 8—Insulin-tolerance tests: *a*, before operation, *b*, after operation.

Several attempts have recently been made to utilise the hypoglycæmic reaction as a means for endogenous release of cortisone in conditions where the beneficial action of this hormone is now securely established. Investigation was directed in this case to the possibility of evidence of overaction of the adrenocortical hormones, but such findings as we have were not such as to suggest that they form an integral part of the clinical picture. The hypoglycæmic stimulation may, on the one hand, have been erratic in onset and, on the other, it may, if repeated too often, have exhausted the store of cortical hormones At the time of this investigation the store of sugar-active hormone must have been adequate, since A C T H raised the fasting blood-sugar level via endogenous release of cortisone Cortisone has a protracted effect over 48 hours, compared with the 24 hr duration of action of A C T H This does not necessarily mean, however, that the steroid output of the suprarenals after A C T H was lacking, since A.C T H. is more rapidly absorbed and has a quicker action than the cortical hormone

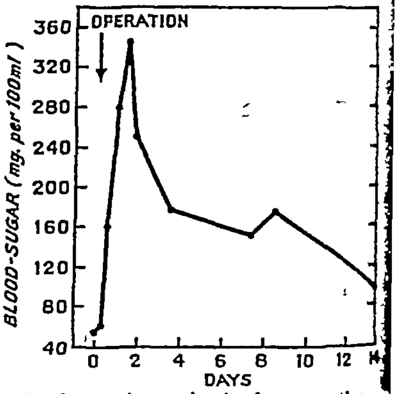

Fig 9—Blood-sugar levels after operation.

Throughout many observations on this patient, it was noticed that there were the usual variations in blood sugar level at which symptoms occurred with the ability to recover spontaneously from severe hypoglycæmia The mechanism of this spontaneous relief may be related, inter alia, to the initial glycogenolytic effect of adrenaline like substance released from the suprarenal medulla, the consequent stimulation of the pituitary, release of A C T H and sugar-active steroids, or perhaps (Vogt 1950) to a direct effect of hypoglycæmia on the anterior pituitary It should be noted that acidotic breathing was not observed in the present case, indeed, the breathing was of the apneustic type indicating severe anoxic depression of the respiratory centre, following cerebral glycopenia and vasoconstriction Increased synthesis of acetylcholine within the central nervous system is another sequel of hypoglycæmia, Feldberg (1945) has suggested that this may explain the convulsive attacks

Of major importance in this study is the comparison of the effects of three substances which are at present under close scrutiny in the field of rheumatic disease

A.C.T.H. acts by causing an endogenous liberation of sugar-active steroids in the presence of a normally functioning adrenal cortex, and so its effects parallel those of cortisone. Both A.C.T.H. and cortisone raise the blood-sugar level (Conn 1950 Sprague et al 1950) possible explanations of this action are decreased utilisation of sugar in the tissues and increased gluconeogenesis. Probably the main effect of both these substances is derivation of sugar from amino acids, since utilisation of sugar in the tissues is still taking place as recorded by falls in serum inorganic phosphorus during sugar administration (Thorn 1950)

Both A.C.T.H. and cortisone raised the fasting blood sugar level to a considerable extent in the present case and increased the capacity of the fasting patient for exercise. Indeed it seemed as though there was greater mobilisation of sugar after exercise This may have been due to a greater accessibility of stores built up from amino-acid during the short course of the hormones that was given In a comparable way, the high protein diet, advised by Conn for obviating the danger associated with a diet rich in sugar, provides the patient with amino acids which are absorbed and metabolised partly as sugars, but at a rate which is relatively slow and steady Thus, the endogenous and exogenous provision of amino acids seems to be necessary for the stabilisation of severe hypoglycæmia.

There was a fairly well marked decrease in the number of eosinophils after A.C.T.H., but the response to cortisone was not so dramatic. There have been several reports of wide variations in the eosinophil-count after the administration of cortisone (Sprague et al. 1950)

Sodium γ resorcylate is a new compound synthesised during the systematic studies of derivatives of benzoic acid Its effect on rheumatic fever has been reported by Reid et al. (1951) During this study a reduced sugar tolerance was incidentally found An action like that of A.C.T.H. on the repair of fibrous tissue has been reported by Clayton (1951) and a similar effect is described by Buttle (1951) on formalin arthritis induced in laboratory animals. In view of these findings it was administered to the present patient and improved his response to exercise but did not significantly alter the blood-sugar level On the other hand therapeutic successes may be psychologically induced and may themselves lead to beneficial endogenous liberation of adrenocortical hormones. As has been observed, the patient with islet-cell adenoma of the pancreas may be symptom free on one occasion with a blood-sugar level which is productive of severe hypoglycæmia on the next Whatever their final status, these substances may well prove useful adjuncts in the treatment of spontaneous hypoglycæmia.

We wish to thank Prof C F W Illingworth, in whose wards this case was investigated, for helpful guidance in this study; Prof. J W McNee for supplies of A.C.T.H. and cortisone; Dr. J Reid for supplies of γ resorcylate; Prof T F Rodger and Dr H. I Clapham, of the psychiatric unit, Killearn Hospital, for access to case-records; Prof J N Davidson for the biological assay; and Dr J R. Anderson for the pathological report.

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Reviews of Books

Soviet Genetics

A. G MORTON, B.SC., PH.D London: Lawrence & Wishart. 1951 Pp 174. 15s

THE difficulty of obtaining precise information about the experimental basis of the Russian agrobiological theories of Michurin, and particularly of Lysenko, has confused the controversy which these theories have excited In this book Dr Alan Morton makes an attempt both to clarify the issues and to present the experimental evidence He succeeds in giving a readable exposition of the present theories in the U.S.S R and explains their origin in detail. The reader is left in no doubt about the beliefs of Lysenko and his followers.

> Heredity is a property of the whole organism and not determined at all by genes. Chromosomes are not permanent structures carrying hereditary elements, and between mitotic divisions the nucleus is structureless. Adaptive variations are acquired and become heritable by virtue of changes in metabolism. Fertilisation is a form of metabolism in which two equivalent cells assimilate one another

> The Michurinists are more modest than Mendelists: they do not put forward any explanation of the regularities of segregation first observed by Mendel

But Dr Morton's account of Soviet genetical experiments is disappointing In the articles quoted many details—even numerical ones—are given. But just those crucial facts—like the number of seeds sown and how many came up, how many seeds were finally produced from the crop and how many of these sown the next year—are withheld Moreover, there are hardly any data on animal genetics and nothing at all on human heredity The general picture of Soviet biology and genetics today we are told is one of extraordinary vitality, activity, and fearless experimentation. Scientists in other countries wish their Russian colleagues good hunting, but must not be expected to accept their claims unless the published accounts of their methods and results are detailed enough to carry conviction.

Much of Dr Morton's book is devoted to explaining why the Michurin standpoint is so useful. The decision to reject Mendelian theory was taken on scientific grounds its persistence was held to be harmful to the progress of agriculture From time to time the practical value of Mendelian genetics has been overestimated by enthusiastic research workers, and the tendency for a scientific discipline to be overvalued might justify a government's being cautious about spending money on its development. But it could hardly justify rejecting as false a body of knowledge already established by painstaking even if useless observations; and from the present account this seems to be exactly what the Soviet government has done To make the action appear more reasonable, Dr Morton points to some of the difficulties and unsolved problems which are occupying the minds of geneticists in the West. He is incorrect however in supposing that the whole structure of the gene theory is tottering on its foundations because some Mendel Morganists are modest enough to admit that they still have a great deal to learn and are consequently less useful than they would like to be.

Patterns of Disease

On a Basis of Physiologic Pathology FRANK L. APPERLY M.D London: J B Lippincott. 1951 Pp 456 63s

Physiologic pathology may not be a very happy term but it stands for the right method of approach for students in their study of disease processes. Professor Apperly has written this book from the standpoint of the pathologist working from first principles—beginning with altered physiological function and progressing to morbid structural changes, with final cure or death. Throughout the book he has rightly emphasised the compensatory mechanisms which the body adopts to overcome or combat disease and the overactivity of unaffected organs to make up for underactivity of others.

Dividing his subject into 27 sections he manages to present in less than 500 pages a remarkably full picture of general and special pathology His style is clear and concise, and if at times his teaching is dogmatic this is perhaps necessary, and is in any case not a fault the medical student will resent More advanced or specialised readers may question some of the arguments, or the mechanisms described, and in places the diagrams and explanatory charts seem to make pathology almost too simple But nothing but praise can be given for the orderly and systematic way in which so vast a field is surveyed, and the book will be especially welcome to those revising their knowledge before one of the higher examinations

Les bruits du coeur et des vaisseaux

A CALO Paris Masson. 1950 Pp 556 Fr 2600

SINCE Laennec's day a great deal of our knowledge of the heart sounds has been contributed by French clinicians, and many of their original descriptions of auscultatory phenomena have become classical. In present times the phonocardiograph and allied instruments, by their ability to record these findings, reduce in some degree the former need for picturesque verbal definitions of the sounds heard through a stethoscope But the French language, which lends itself so well to vivid word-painting, is appropriate for a monograph of a descriptive nature, such as this The author, working in Tunis with Professor Clerc, has studied his subject for fifteen years, collecting a bibliography of 1257 references Some 24 of these are original publications under his own name, one being a study of the five normal heart sounds and their physiological reduplication, which shows how complicated the subject has now become He has presented a very complete and useful treatise on the physiology, recording, and analysis of heart sounds It is a pity that the reproductions of many of his diagrams suffer from faulty printing

Between Life and Death

HARLEY WILLIAMS London Jonathan Cape 1951 Pp 285 16s

Dr Harley Williams has broken no new ground in these short biographical sketches of some of the great names in medical and surgical history, but he has embellished his subject matter with witty comments on the idiosyncrasies and foibles of his subjects He does not forget the unreasoning contumely from which some of them suffered at the hands of jealous and small-minded contemporaries In the chapter on the discovery of anæsthesia he gives the credit to Morton which was so long denied him The chapter on Sigmund Freud and the story of the birth and development of psycho-analysis is particularly interesting

The Unconscious Significance of Hair

CHARLES BERG, M D, D.P M, consulting psychiatrist to the British Hospital for Functional Nervous Disorders London Allen & Unwin. 1951 Pp 106 15s

THE formula manifest in this book is popular among psycho-analytical writers Some widespread feature of human behaviour is taken, preferably one concerned with some part of the body The dreams and free associations of a few analysed patients are reported, with comments to demonstrate its unconscious significance in them The *Golden Bough* and other anthropological sources yield instances of curious rituals which are not inconsistent with the symbolic interpretation thus arrived at in accordance with psycho-analytic procedure these are adduced with reinforcements from poetry and general literature The normal behaviour in question is then held to have been demonstrated to have remote libidinal origins, and to be in effect a psychopathic incursion into conscious life With widely varying degrees of sophistication, caution, and literary tact, this line of argument is presented by psycho-analytical writers, to make us realise how irrational may be the basis on which many of our ideas and institutions rest It may be true, but it is not convincing What was once said of the Devil and Holy Writ may be urged against this method of selective quotation and isolated instances Dr Berg's thesis is that when we cut our hair we are not only following a social custom but dealing with an unconscious conflict and so wasting defensive energy, hair is a substitute for the genital organs, and in cutting, brushing, and shaving it, modern man is exhibiting "a ritual symptom exactly analogous to many savage and ancient customs—for example the subincision ceremony of the Arundas"—whereby he copes with his castration complex without any change in his character The sexual associations of hair are sufficiently obvious, very likely in some patients, when they are being psycho-analysed, it plays the rôle which Dr Berg attributes to it, but a little consideration suggests the need for much more stringent examination of the matter before his main conclusions regarding the general run of people can be accepted

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Progress in Allergy—The series reviewed last week under the title of *Fortschritte der Allergielehre* used to be written largely in German, but since the war the policy of Dr Paul Kallos, the editor, has been to publish it in English, and in the volume reviewed there is only one article in German. For this reason Dr Kallos and his publishers wish the series to be known as *Progress in Allergy*, and not by the old German title

Recent Advances in Bacteriology (3rd ed London J & A Churchill 1951 Pp 325 25s)—In this edition, Dr J D MacLennan deals not only with the clinical applications, of new work on the *staphylococci*, *streptococci*, and diphtheria bacilli, but also with the morphology, physiology, and classification of bacteria Viruses, formerly bedfellows with bacteria, he wisely leaves out There are short accounts of chemotherapy and the antibiotics, and a summary of the detailed work on the antigenic structure, pathogenicity, and taxonomic position of some members of the enterobacteriaceæ. The anaerobes and their diseases take more than a third of the book. The chapters vary in quality, probably because of interruptions in writing and delays in publication. The book culls and distills the facts from an enormous number of sources, and for this the busy medical bacteriologist will be grateful

Clinical Hematology (3rd ed London Henry Kimpton. 1951 Pp 1048 £4 10s)—It is five years since the last edition of this standard work appeared, and in that interval the contributions to hæmatology have been, as Prof Maxwell M Wintrobe says at the outset, truly substantial This new information, well digested, has been inserted into his new edition, and though the book is 180 pages longer in consequence, it is certainly not more diffuse Some satisfactory new colour plates and monochrome photomicrographs of marrow cells have been added Professor Wintrobe's judgment of new techniques or treatments is fortunately always biased by practical experience, and for the most part represents well the views of hæmatologists who have to handle clinical cases. In the technical section there is a warning that when a photo-electric hæmoglobinometer has been acquired the technician's troubles are *not* over these instruments need just as careful standardisation as do others Professor Wintrobe returns to the charge against "shotgun" therapy, which has certainly become a serious menace He gives a chart showing that it is about ten times as expensive to treat patients by these commercial mixtures *as it is to* treat them properly The modern work on folic acid and vitamin B_{12} is fully discussed and he supports the view that clinical megaloblastic anæmias are due to deficiencies, in various combinations, of both folic acid and vitamin B_{12}, but he admits that "our ignorance regarding the pathogenesis of pernicious anæmia and the related macrocytic anæmia is still great" In the treatment of iron deficiency anæmias, he does less than justice *to* the intravenous preparations now successfully used in this country; even the bibliography is, for once, inadequate This may be because the treatment has been only slowly introduced in the U S.A Among the new pictures, a startling one of the lead "line" in the gums shows very well its discontinuous character In the section on leukæmias the value of the various treatments, including A C T H. and cortisone, are fairly assessed His style has matured with time, and parts of the book are now very readable, and as in previous editions the lists of references at the chapter ends are outstanding Every hæmatologist will need a copy of this third edition, and it will soon become well worn

THE LANCET

LONDON SATURDAY, FEBRUARY 9, 1952

Voluntary Service to Hospitals

PARADOXICALLY, the development of a Welfare State can widen in some respects the gap between government and people To administer our new social legislation the Government (or its agents) has to concern itself more closely than ever with the lives of each one of us, and this contraction of individual freedom which is part of the price we pay for closer association and mutual security, may tend to set the governed against the governors Such a rift if allowed to widen, would be incompatible with thriving democracy, and furthermore those who came to see the State primarily in the rôle of controller might be the readier to call improvidently on it as universal provider, thus undermining the social services Such a development can be partly warded off by the association of professional administrators with volunteers who will thaw the frozen touch of bureaucracy This warmth is nowhere more necessary than in the health services, and notably in the hospital service Here voluntary helpers can do much to prevent the hospital from acquiring the status of a Government-controlled technical institute They can also meet the contingencies for which it is impossible to legislate sickness and its social consequences acknowledge no schedules. Thus the National Council of Social Service and King Edward's Hospital Fund for London have done well to sponsor an investigation into the volunteer's opportunities in our hospitals This study [1] made by Mr JOHN TREVELYAN and others with the help of an advisory committee makes it clear that the actual need for voluntary help far from having diminished is continually increasing

What prompts a man or woman to give time to such work? Motives are seldom single or constant, and they may not even be distinguishable Exceptionally a desire for power may underlie participation in voluntary services The cynic might say that in voluntary committees the power hunter can achieve his object very comfortably, since the complementary burden of responsibility is diffused through the whole group. The report remarks wryly that a person who gives a voluntary service because of some personal aim or ambition has a strong incentive to efficiency', but it adds that the unworthy motive cannot fail to affect the service given,' and that "the true spirit of service is an important factor' But the right spirit is not enough there must also be the means and the report examines in some detail the question whether voluntary workers in the hospital service, and notably the statutory authorities (which are composed of unpaid volunteers), are enabled to give of their best It finds that, in general, the method of appointing members of regional hospital boards is satisfactory Appointment by outside nomination is not a practicable alternative, for the Minister of Health, who delegates to these bodies responsibilities laid on him personally by Parliament, should be free to decide on their membership Likewise the report rejects an alternative proposal that the boards should comprise representatives of major local authorities together with a minority of doctors elected by the profession in the region

> 'Presumably control by Local Authorities would have to be accompanied by a revision of the financial arrangements requiring a substantial part of the cost of the hospital service to be met from rate funds, as proposed in 1944 Such a proposal is not likely to be welcomed at the present time by Local Authorities which are already heavily burdened with high rates.'

As things stand politics may occasionally enter into the choice of a member, but an adherent to a political party may still serve usefully on a board, and such people are unlikely to be appointed in large numbers since this would provoke an outcry from the opposing party Nevertheless the consultation preceding an appointment might suitably be made less a matter of form

Equally important is the attitude with which the regional board approaches its work "There seems to be general agreement that the strongest loyalty is local loyalty to a particular hospital, a town or a district," and 'unless the boards find some overriding loyalty the sectional interests which are already evident may well in time destroy such cohesion as exists" What then can become the unifying force? It may be that if the boards were given a fuller measure of autonomous responsibility and of financial independence the increased collective responsibility would foster a greater sense of unity Unfortunately, as the report remarks, the trend is in the opposite direction the Minister and the boards, who were to be principal and agent, are tending to become master and unpaid servant.

> "In practice the Regional Boards have become primarily administrative bodies standing between the Ministry and the Management Committees and exercising functions which appear to exceed those of an overseer, and which in some regions can more accurately be described as those of a controller

The right men and women will not be attracted to this work unless they are employed according to their abilities, and the Minister should take the admitted risk of devolving responsibility on the boards while the boards in turn should gradually hand over to management committees 'a substantial measure of administrative autonomy" Personal contact between the various levels and notably visits by senior officers of the Ministry to regional boards, might promote better relations. Finally the report upholds the idea of a house committee for each hospital. "We see no reason why they should not be made responsible for the preparation of estimates for the Management Committee, and then be given authority to undertake the day-to-day administration of their hospitals within the approved estimates

Turning to voluntary help to the sick and infirm the report especially emphasises two relatively unexplored aspects—namely, visiting the mentally ill, and work aimed at cheering the lives of the young chronic invalid In these and a score of other directions the various voluntary societies are playing a great part, but there is still scope for individual effort, as is evident from the Cheshire Foundation Home for the Sick, at Liss in Hampshire

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[1] Voluntary Service and the State A Study of the Needs of the Hospital Service Published by George Barber & Son Ltd, Furnival Street London E.C 4 for the National Council of Social Service (Incorporated) and King Edward's Hospital Fund for London 1952 Pp 132. 2s 6d

> "This home was started by a young man, Group Captain G L Cheshire, who was an 'air-ace' of the war, decorated with the V C, the D S O and two bars, and the D F C and bar As a result of personal experience he decided to devote himself to providing a home for sick people for whose special needs the national health service could not provide, and who had nowhere else to go It was to be a home in the sense of a family, and all who were there, staff and patients, were to live a community life helping each other to the best of their ability Any person in need of such a home was to be admitted, regardless of age, sex or complaint The home has at present 32 patients whose ages range from 18 to 92, but in future preference is likely to be given to younger people who would otherwise have to be in chronic sick hospitals It is believed to be the only home that provides for the young chronic sick the opportunity to lead as *normal a life as they are able to lead, with all the nursing* care that they need"

At one time the need for material relief was so great that all other considerations tended to be excluded Now, however, voluntary service can deal with underlying problems which cause anxiety, distress, and sickness The spirit of such service has been fanned into brisk life by the trials of two great wars, which have happily shown that it need not be given by people of only one social class On the other hand, we are all much busier than ever before, for example, more women were in paid employment in 1949 than in the peak war year of 1943, and as time goes by more and more of us will become engaged in caring for aged relations or friends in their homes If, therefore, the voluntary bodies are to meet their growing commitments they may have to abandon their unobtrusive ways and proclaim that they have work for all The National Health Service is, after all, the first example in this country of a public service financed almost entirely from central funds and operated by a Government department and voluntary workers in partnership The purpose of this adventure in administration will be largely defeated if the spirit of partnership does not permeate every level

Blood-groups in Disputed Paternity

Blood-groups have been used for a long time to help in cases of disputed paternity The ABO groups were soon found to have many features suited to this purpose their mode of inheritance is quite simple, and their distribution in the population is known, they are properly developed at birth and do not change during life, and, furthermore, potent antisera for detecting them are regularly used in all clinical pathological laboratories The possibilities of excluding paternity were further increased when in 1928 Landsteiner and Levine provided similarly detailed information about the MN groups But the antisera for the MN groups are not so easy to prepare, nor are the results so easily read, as with the ABO groups, consequently MN grouping has been limited to special laboratories Andresen,[1] at the Copenhagen Institute of Forensic Medicine, reported in 1947 the results of 20,000 paternity tests with ABO and MN groups, and the results confirmed our ideas about their inheritance

Blood-group testing for disputed paternity works in a negative sort of way The results will show that Mr X could be, or could not possibly be, the parent of child Y, they will not show that Mr X *is* the father of the child In this country the expense of blood grouping has to be borne by Mr X, who is stoutly maintaining that he is not the father of the child and that he should not, therefore, pay for its maintenance Mr X naturally wants a reasonable chance of a successful result, and if the tests show that it is possible for him to be the father his case may be weakened Wiener[2] has calculated that in New York the chance of a wrongfully accused man being excluded by ABO-group testing is about 20%, and by combined ABO and MN testing 34 4% The scales are thus weighted in favour of the mother who is applying for the maintenance order, even if she agrees to be tested and to allow the child to be tested If the mother thinks her case weak she may well refuse, and in Britain the courts will not order the tests to be done In other places, like Denmark and New York, the courts will order tests to be done and will give proper weight to the evidence of the results Today the value of blood-groups in disputed paternity has been changed by the discovery of more groups, most of which can be used to increase the likelihood that a wrongfully accused man will be excluded from paternity[3] Wiener[2] has surveyed the results of 623 cases of disputed paternity, in 104 of which the accused man was proved innocent by a combination of ABO, MN, and Rh grouping, and he calculates that by this combination about 50% of wrongfully accused men will prove their innocence. The details of the cases include two interesting points one is that a man may be excluded by one or two of the blood-group tests but not by all three, and the other is that in these cases the New York court accepts the evidence and dismisses the suit

For Rh testing the following antisera are available anti C(anti rh′), anti c(anti-hr′), anti-D(anti-Rh), and anti-E(anti rh″) R A Fisher has calculated that with these four sera alone a man has a 25% chance of exonerating himself The value of other blood-groups has been discussed by Race and Sanger[3] Factor S is now known to be linked with the MN group, and though the supply of anti-S serum is still limited the factor will soon be useful for these tests Results with factor P are not very reliable, and its use is not recommended The "Lutheran" and "Kell" groups will be usable when antisera are more generally available, their manner of inheritance is known, and their distribution in Western Europe has been properly worked out The "Duffy" groups are similarly of value, and adequate data about their inheritance and distribution have recently been published[4] Finally the test of salivary secretion of ABO and the related "H" substances can also be used since the function is inherited independently Race and Sanger calculate that from present knowledge of gene frequencies in the English population, using ABO, MNS, Rh, Lutheran, Kell, Duffy and secretion tests, an expert laboratory in England could exclude about 62% of wrongfully accused persons Such an estimate means that the odds are now in favour of the innocent male defendant, and it would be in his interest to submit to the tests Unfortunately for him, his chances of having the full range of tests done in this country are remote, only a few laboratories, connected with the National Blood Transfusion Service, possess the necessary testing sera. He might get ABO, MN, and Rh tests done, and this would give him a 50–50 chance of proving his innocence Even if he can get these tests done, however, the court may not accept the results For instance, about two years ago we reported [5] a case of a paternity dispute concerning two children in which 1 out of 5 blood tests showed that the male defendant could not be the father this evidence was not accepted as conclusive. Such evidence would almost certainly have been accepted by courts accustomed to hearing the results of blood tests

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[1] Andresen P H *Acta path microbiol scand* 1947 24, 545

[2] Wiener A S Proceedings of the International Society of Hæmatology Cambridge 1950, p 207

[3] Race, R R, Sanger, R Blood Groups in Man. Oxford 1950

[4] Race, R R, Holt, H A, Thompson, J S *Heredity*, 1951, 5 103.

The increase in the range of blood group tests makes it all the more regrettable that Lord MERTHYR s Bastardy (Blood Tests) Bill was a war victim when it had passed the Select Committee of the House of Lords and was to go forward for the third reading By this measure the court or either party could have demanded blood tests, experience in other countries has shown how valuable such evidence can be The Bill also specified that the tests must be done by medically qualified practitioners, today this is unnecessary and would in fact exclude some of the leading experts in this field It might be possible to designate nationally controlled laboratories for the purpose, provided that they had the staff to deal with this extra work.

Gaps in the Tuberculosis Service

TUBERCULOSIS is having much well deserved attention just now, and the various regions are attacking its problems in ways appropriate to local conditions and mood Nevertheless there are still gaps some of which have lately been pointed out by Dr B A. DORMER,[6] who as chief tuberculosis officer for the Union of South Africa sees them with the impartial eye of an onlooker He mentions the failure of some teaching hospitals to interest themselves in tuberculosis, and the disadvantage—proved by a study of case records—of not having a thoracic team associated with a teaching hospital He welcomes the appointment of chest physicians and believes that they should always have beds under their charge In some regions, he finds they have both tuberculosis and non tuberculosis beds at the local general hospital tuberculosis wards in the local infectious-diseases hospital, and some beds in the local sanatorium and this he thinks is the ideal ' A chest physician without beds is a tuberculosis officer of the old school under another name and will achieve nothing ' This judgment is unduly harsh there are various ways of using chest physicians profitably, as recent surveys have shown [7], but it is noteworthy that this is how the situation strikes an expert from abroad.

Dr DORMER reminds us that the growing interest in tuberculosis has meant also more efficient diagnosis and treatment of other chest conditions bronchiectasis, asthma, emphysema, and carcinoma of the bronchus are being seen more often by chest physicians, and are being treated earlier But he thinks that the association between chest physician and thoracic surgeon is seldom close enough ' In some areas they conduct parallel clinics in competition They should clearly work as a team, and presumably in most places that is what they do One thoracic surgeon, he estimates should be able to do the surgical work for two chest physicians He shares our suspicion [8] that the present elaborate system of mass radiography units each with its team of ten or eleven members ' exists to discover comparatively few cases of tuberculosis each year ", and he would have this diagnostic apparatus put at the service of the chest physician to radiograph the sections of the community in which he is most likely to find tuberculosis Since over 95% of notifications of pulmonary tuberculosis originate with the general practitioners he proposes that miniature attachments, fitted to X ray plants in chest clinics, should provide practitioners with an X ray service all round the clock. The fact that regional boards are now responsible for hospitals sanatoria, infectious-disease wards, dispensaries, and chest clinics should leave medical officers of health freer to develop their other duties of preventive teaching and aftercare, but Dr DORMER did not find many of them engaged in vigorous educational campaigns indeed most of them left education in chest diseases to health visitors and chest physicians He thinks it odd that the M O H, so fully aware of his responsibility in preventing diphtheria, smallpox whooping cough, and measles, feels so little concern for tuberculosis General practitioners, he hints should also be taking more responsibility for the tuberculous, they do not realise that all but 5% of cases of tuberculosis are referred from their surgeries that most of them are diagnosed too late and that at any one time half the positive-sputum cases on the dispensary registers are under their care

Had he been reviewing the bed situation Dr DORMER might have commented on another important gap in our service—namely the lack of adequate provision for patients with uncontrolled chronic disease The danger to which others are exposed by these deteriorating cases is well recognised in London where it presents some special features Sir ALLEN DALEY s last report [9] to the London County Council reminds us that 11 per 1000 of London s population are known to have active or quiescent tuberculosis and a further 4 per 1000 may be presumed to have unrecognised disease This gives an incidence of 1 5% in the London population of whom about a quarter are producing tubercle bacilli in the sputum Moreover there is evidence, the report says that minimal and sputum negative ' lesions are more infective than we have hitherto believed Tuberculin surveys show that by their fifth birthday 10% of London children have already met sufficient infection to develop a positive tuberculin reaction and the fact that the death rate has been falling ever since 1800 means among other things as the report grimly notes that patients have more years in which to infect others The Londoner, moreover encounters infection not only among his 3½ million fellow citizens but also among non Londoners who come in to town to work, shop or be amused.

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[5] Lancet, 1950 i 418.
[6] Brit. J Tuberc. 1952 xlvi 6
[7] Lancet 1951 i 1364 1951 ii 33 Feb 9 1952 p 305
[8] Ibid. 1950 ii 760; Jan. 26 1952, p 104
[9] Report of the Medical Officer of Health and School Medical Officer 1950 Published by the L.C.C., County Hall, Westminster Bridge S E.1 Pp. 102 2s 6d.

Living quarters, too, are crowded a post-war housing survey showed that in Holborn, in 1947, nearly a third of the residents were living under conditions of gross overcrowding Industrial and commercial buildings have multiplied at the expense of dwellings, which are now more often than not built in vertical layers, so that the number of people per acre of ground has increased, and their chances of meeting and inhaling each other's breath are therefore greater Scattered through this vast concourse of people—in public transport, shopping queues, cinemas, theatres, inns, milk-bars, public lodging-houses, schools, stadiums, lifts, picture galleries, hospitals, council chambers, and their own homes—are not only unrecognised infectious cases but also patients with old chronic disease who either believe themselves harmless or have ceased to care what harm they do to others

On the unrecognised case we are slowly but surely catching up Mass radiography, used not only on patients referred by general practitioners but on other groups likely to show a high incidence (contacts, people exposed to dust hazards, people working in crowded industrial centres, school-leavers, entrants to the Forces, nurses), will in time sift out most of the early cases in coming years But, unless we do something about them, the old chronic cases will still be there, sowing a fresh crop of infections every year of their lives It was right to concentrate first on giving better care to the early cases—to those for whom something can be done And an important means of preventing spread of the disease is to make new cases non-infective as soon as possible But the time has now come when we must surely pay more attention to the existing reservoirs of the disease

What is the present fate of these chronically sick people, some of whom live for many years ? Dr C R LOWE and Dr J E GEDDES [5] found that 22% of patients in four sanatoria in the Birmingham area were there for social reasons only, and could have left if there had been suitable residential homes for them Some had no home of their own, some had formerly lived in lodgings, and some would have had to share a bedroom or a bed if they had returned to their families Cases of this sort have occupied—sometimes for many years—beds needed for acute cases LOWE and GEDDES mention two women who had been in sanatoria, one for nine, the other for twenty-one, years, and Dr ESTHER CARLING tells us of a woman who has already spent twenty-three of her thirty years in a sanatorium Thus, as Dr CARLING says, the service for the hopeful cases silts itself up The tuberculosis wards of some general hospitals are used as a refuge for old chronic cases, who spend their last months or years there, but waiting lists for such wards are long, and do not diminish Again, if the sanatorium staff harden their hearts and send out a patient because his bed is needed for a more hopeful case they may be depriving him of his slight chance of survival Dr CARLING mentions a girl who, for over two years, had been given every possible care in a sanatorium, culminating in pneumonectomy This offered a frail hope of recovery—provided she could have at least two more years of fostering care Her bed was needed for others, but where was she to go ? Her home, unsuitable in any case, was in Ireland, the journey was out of the question, and an ordinary convalescent home was thought to be too strenuous Such patients, though they are past benefiting from medical treatment or skilled nursing, need the sort of care that will segregate them from the general public and enable them to live a life which is neither useless nor unhappy even though it may be restricted They are in much the position, as LOWE and GEDDES point out, of the frail ambulant elderly patient, whose place is neither in the hospital nor in the residential home, and like him they need appropriate hostels

Where are such hostels to be found ? According to Dr W H TATTERSALL,[6] there are some country sanatoria which almost fill the bill already They lack X ray equipment and facilities for surgery, and are in effect *country convalescent homes* He suggests that some of them should be relinquished to other branches of medicine, in exchange for a proportion of better situated general hospital beds, but it might, in fact, be better to make some of them into *convalescent homes for the tuberculous*—in name, as in fact.

Besides patients who are too ill to do without some nursing care there are others—more able, or both more able and more wilful—who would not consent to live in such remote havens Some indeed are fit to carry on with a job provided they are not allowed to be a danger to others These need hostels near their work, and the provision of such hostels is, under the National Health Service, one of the duties of the local authorities London has already begun to provide them on a small scale A plan to convert St Peter's Hospital, Stepney, into a night sanatorium for 50 tuberculous men and an industrial workshop for 150 patients was not, for financial reasons, sanctioned by the Ministry of Health, but a hostel for 35 tuberculous men, most of them in employment, has been established at Stoke Newington, and no doubt others will follow It seems quite clear that the provision of more hostels and convalescent homes for chronic and infective cases is the next great step to take in the campaign against tuberculosis It is not an expensive undertaking, as such things go—nothing like as expensive as it is to provide sanatorium beds for the fresh crops of cases sown annually by these neglected carriers

Isotope Radiography

WE publish this week a paper by Professor MAYNEORD describing how he has taken radiographs using a radio active isotope as a source of radiation The potential advantages of so compact an " X ray unit," independent of electric supply, need no emphasis, and, though the necessary exposures are at present too long for the method to have immediate practical applications Professor MAYNEORD is hopeful that isotopes will be produced which emit the right kind of rays in sufficient intensity to give satisfactory pictures with shorter exposures Where the object to be radiographed is stationary, and time is no object, even an isotope of relatively low power gives excellent results, and the films taken by placing the new midget apparatus inside a dried skull illustrate very plainly the convenience of projections which avoid superimposed shadows. These radiographs of the jaw differ from any ever taken before, and though the accompanying picture, obtained by five minutes' exposure of the living hand, has less obvious technical merit, it should be regarded respectfully as a part of radiological history

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[5] *Lancet* Jan 12, 1952, p 92

[6] *Ibid*, Jan. 26, 1952, p 202

Annotations

FOOT AND MOUTH DISEASE

In the Western zones of Germany last year there were 600 outbreaks of foot and mouth disease in June and 45,000 in November The epidemic reached Holland in September It arrived in Great Britain on Nov 14, and between then and Jan 15 there were 99 outbreaks of the disease with the following animals affected

Animals	*Cattle*	*Sheep*	*Swine*	*Goats*	*Total*
No. "involved	5148	2595	2954	4	10 701
No. affected at time of diagnosis	481	43	11		535
No. affected at time of slaughter	1419	343	11		1773

The total amount of compensation paid in respect of these outbreaks amounted to £344 504 7*s* 8*d*

It is well recognised that the virus may be imported in the lymph glands and bone-marrow of carcases, and this source of infection causes outbreaks from time to time, chiefly in pigs fed on uncooked swill But big outbreaks, such as the present one, and those which developed in 1937–38 and 1924–26 generally coincide with severe disease on the Continent. The epidemics usually begin in the south and east of the country at the time when migratory birds are coming over from Europe. Stockman and Garnett[1] suggested that birds—especially starlings and pigeons—were responsible for bringing the infection but Eccles[2] was unable to isolate virus from 359 dead or 54 live birds obtained from infected farms or districts during 1937 38 and in extensive experiments at Pirbright in which starlings or pigeons were flown from infected to susceptible bovines, the disease was transmitted in only one instance Despite the strong circumstantial evidence some authorities are not convinced that the disease is transmitted by birds and certainly the origin of many outbreaks of foot-and mouth disease is obscure.

Apart from sanitary measures, the disease can be partially controlled by immune serum and by vaccines,[3] of which vaccines adsorbed on aluminium hydroxide have been used most extensively The position is complicated by the existence of three immunological types of virus, known as A O, and C and it now appears that there are three other types of virus in Africa It also seems that in the present epidemic on the Continent vaccines are failing to control the spread of the infection because there are variations within the types, especially the A type of virus: no fewer than six variants have already been described some of which are said to be antigenically different from the others. This variation or mutation of the virus is given as a reason for the failure of vaccine to hold and control the steady and rapid progress of the disease which is now overrunning several European countries.[4] The complexities on the immunological side are such, in fact, that with the English Channel to help us, we shall be well advised to continue with the 'slaughter policy which has proved effective on numerous occasions for the control of this and other diseases.[5] This policy now has the whole-hearted support of the farming community,[6] which it has not always had in the past.

It might be thought that research on foot-and mouth disease was of little importance to us but this is untrue, partly because we import food from countries where the disease exists, and partly because we nearly always have serious outbreaks in the south and east of the country whenever there is an outbreak in Europe—and this despite the fact that we import hardly any animal products from Europe Hence it is to our interest to assist in the control of the disease throughout the world The research station at Pirbright is the international centre for the typing of virus, and much work has also been done on immunisation and diagnostic methods. A complement-fixation test has been developed, and a new and important advance has been made by Skinner[7] who has shown that suckling mice can be readily infected with guineapig or unadapted cattle strains of virus. The type of foot and mouth disease virus in any outbreak can now usually be diagnosed within two days

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[1] Stockman, S Garnett M *J Min Agric* 1923 681
[2] Eccles, A. *Bull. Off int. Epiz.* 1939 18 118
[3] Francis, J. *Lancet*, 1948 i 377
[4] *Brit vet. J* 1951 107, 474
[5] Francis, J *Vet. Rec* 1948, 60, 361
[6] *Farmers Weekly* 1951 35 31
[7] Skinner H H *Proc R Soc. Med.* 1951 44 1041

AN UNUSUAL EPIDEMIC

Cases of acute labyrinthitis crop up from time to time to baffle the practitioner with a set of alarming and transient symptoms but at the moment a minor epidemic of the disorder seems to be in progress A Hampstead doctor has seen 6 cases between Jan 11 and Jan. 28 and has diagnosed in retrospect 3 cases seen last year in March April, and October We have heard, in addition, of 3 cases referred to a neurologist during the last few months, and a single case seen by another general practitioner

The symptoms have usually been very sudden in onset: the patient is seized without warning perhaps on sharply turning the head with severe vertigo and either falls to the ground, or staggers and sways uncontrollably 'The floor came up and hit me or Everything started whizzing round" are usual descriptions of the event. One patient got out of bed in the morning feeling perfectly well, turned her head to look at the clock and was instantly seized with such extreme giddiness that she swayed drunkenly as she tried to walk she had to be laid on the floor or else packed into a chair with cushions to keep her from falling Another, leaving a meeting at which she had been presiding crashed to the floor while waiting for the lift; a third was stricken while buying goods in a shop a fourth while crossing the road and a fifth while cooking Commonly the doctor sees these patients first after they have been put to bed they are then lying straight with their eyes shut intensely still they have discovered that the least movement of the head brings on vertigo Nystagmus is usually present, of labyrinthine type rotatory with the quick phase to one side. If the patient is told to touch the doctor's fore finger and then to repeat the action several times with his eyes closed his arm deviates to the side opposite to the quick phase of the nystagmus. Vomiting of cerebral type, without nausea, is usual, and may persist for several days The vertigo may be moderate and continuous, or come in violent waves lasting ten minutes or so and then subsiding considerably these become progressively less severe, and may disappear in the course of two or three days On the other hand mild vertigo may persist for several weeks being specially noticeable when the patient moves the head suddenly or stoops Some tinnitus may be present at the outset but patients sent, after recovery to an otorhinologist were not, then found to have any signs of trouble in the ears

Some of the cases have been associated with colds or sore throats one had recently come from a family suffering from some undiagnosed febrile illness. One had a slight leucocytosis her cerebrospinal fluid however was normal Another ran a temperature of 102°F for one day after which it returned to normal Once the attack has subsided there has usually been no recurrence but in one patient the symptoms subsided almost completely in three days and then recurred with their former violence. It is possible in this case that infection attacked first one labyrinth and then the other but the nystagmus did not change direction and it seems more likely that this was an example of relapse No special age group has suffered; one patient was a schoolgirl, two were elderly women, and most were in their middle years.

The nystagmus and the violent onset of vertigo may suggest a thrombosis of the posterior inferior cerebellar artery, but in these patients there was no hypotonia, adiadokokinesia or signs of involvement of the spinal tract of the trigeminal nerve. Ménière's disease or disseminated sclerosis of acute onset may also be suspected; but the rapid, or moderately rapid, recovery, with little tendency for the symptoms to recur will settle such doubts.

From the history, the onset, and the transience of the symptoms, it seems very possible that these are cases of a virus infection; but we know of no evidence of how the infection is spread. The cases reported here were scattered—several in Hampstead, one in Surrey, one on board a liner from America. It would be interesting to know whether other practitioners have been seeing cases and whether there are examples of more than one case in a family.

CROWD BEHAVIOUR

Crowd behaviour has usually been described in one of two ways: either qualitatively, in terms of social or psychological concepts, as in the classical studies of Le Bon,[1] Trotter,[2] and Freud[3]; or quantitatively by such relatively modern methods as Mass Observation or Gallup polls, which provide objective data but tend to neglect the processes underlying the measurable phenomena with which they deal.

In a new book Prof. L. S. Penrose[4] sets out, to quote his introduction, "to formalize some of the concepts used by students of crowd psychology with a view to expanding knowledge of the static and dynamic mechanisms involved in the spread of ideas in populations." He surveys the subject from many aspects with commendable clarity and a minimum of mathematical formulæ, taking as his fundamental unit a person with a given idea or potential reaction pattern. Such an individual, as all writers on crowd psychology agree, behaves differently as a member of a group from the way he behaves as an individual; and the size of the group, as Ortega y Gasset[5] emphasised, affects its susceptibility to influence and the strangeness of its reactions. Rickman[6] agreed with this view, instancing the Œdipus complex of Freud, which is a relation between three people. The influence of this factor of size of the group is discussed by Penrose, who points out that in a small collection of people a change of opinion among a few may easily alter the attitude of the whole group. In a committee or electorate, where democratic principles are accepted, the vote of the majority decides the course of action. "If most of the voters are indifferent or divided in opinion in a random manner, it is comparatively easy for a surprisingly small set of resolute members to control almost every decision. The remarkable fact is that, although the power of an individual or bloc vote becomes gradually less, as the group becomes larger, this power only decreases as the square root of the number of indifferent voters. Furthermore, the proportion of the electorate needed in the resolute bloc, in order to exercise any given degree of control, decreases with the size of the group; this proportion is, in fact, related inversely to the square root of the number of indifferent voters." Thus, to obtain a majority in 99.9% of decisions, a bloc of 15 is necessary in a group of 25, but of only 150,000 in a crowd of 2500 million "indifferent" voters. The successful control by a small minority bloc depends, of course, on the remainder of the voting population being indifferent and not itself organised into blocs. Penrose remarks that the power of an oligarchy may be increased by breaking down units likely to form blocs of opinion; and he gives as an example the liquidation by the Nazis of ideological groups of all kinds, sports clubs as wel as religious bodies. Another method by which the power of a resolute minority may be extended is by some stratified or hierarchical system of control; this method is widely used in authoritarian organisations and serves well the purposes of military, religious, political, and industrial bodies.

In considering the dynamic aspect of crowd psychology, Penrose points to the close analogy between the epidemiology of infectious diseases and the dissemination of ideas in communities in regard, both to the stages by which they spread among the exposed population, and to their limitation and subsequent decline; this is due not merely to saturation of the susceptible contacts but to the development of fresh immunity. The view of an epidemic as a self-regulating phenomenon, capable of biological and statistical analysis, was sponsored by Greenwood[7] as regards infectious disease, and the similarities between physical and mental infections was observed over a hundred years ago by Hecker[8] in his study of medieval crowd behaviour. From this standpoint Penrose discusses crazes (the use of thallium as a depilatory, in the treatment of skin diseases), an outbreak of religious enthusiasm among the members of a Doukhobor community in Canada in 1902, and two outbreaks of panic in America (a run on a bank, and the *Invasion from Mars* broadcast of 1938[9]).

In the field of politics, Penrose suggests that the tendency, in a stable society, for two main groups to emerge may be due to a dynamic process whereby ideas of a political character produce immunity: all positive political movements seem naturally to produce opposition movements. In examining the results of the 26 United States Presidential elections from 1844 to 1944, he concludes that the electorate in that country does not vote as random units but in blocs, and that in the first 15 of these elections there were 15,245 blocs of about 29,000 voters each, whereas in the last 11 there were only 28 blocs, of 1,034,000 each; from which he deduces that as a population grows larger it may coagulate into blocs more easily. The results also show a tendency for a swing to occur at regular intervals in favour of one or other party, which may reflect development of immunity to the political ideas of the party in power. The system of constituency representation, such as obtains in the United Kingdom, favours the emergence of two main parties; it is very difficult for a minor party to obtain representation unless its adherents are concentrated in one or two localities. Also, in the elected assembly the difference in strength of the two parties is much greater than the difference in the total electoral votes; in regard to the British Parliament an empirical relationship called the law of cubic proportions, has been discussed by Kendall and Stuart.[10]

War as a form of crowd activity has been extensively studied. Both Clemenceau and Clausewitz regarded it a "the continuation of policy," while Ludendorff style it "the highest expression of the national will to live Penrose classes it as a disruptive activity, and agre with a statement by Dr. Brock Chisholm in 1949: "W must discard warfare as an obsolete behaviour patter

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[1] Le Bon, G. Psychologie des foules. Paris, 1895.

[2] Trotter, W. Instincts of the Herd in Peace and War. London, 1920.

[3] Freud, S. Civilisation and its Discontents. London, 1930.

[4] Penrose, L. S. On the Objective Study of Crowd Behaviour. London: H. K. Lewis. 1952. Pp. 74. 10s. 6d.

[5] Ortega y Gasset, J. Revolt of the Masses. New York, 1932.

[6] Rickman, J. *J. ment. Sci.* 1950, 96, 770.

[7] Greenwood, M. Epidemics and Crowd Diseases. Lond 1935.

[8] Hecker, J. F. C. Epidemics of the Middle Ages. Lon 1844.

[9] Cantril, H. Invasion from Mars. Princeton, 1940.

[10] Kendall, M. G., Stuart, A. *Brit. J. Sociol.* 1950, 1, 183.

He suggests that, its pathological nature being granted its natural history can be deliberately studied with a view to prevention with the same energy that has been successfully applied to diseases like plague, cholera and tuberculosis. Wright[11] has thoroughly analysed the history of recent wars from a quantitative point of view, measuring the amount of disturbance by the recorded casualties. He demonstrated certain regularities major disturbances tending to occur at intervals of about one hundred years, with less severe disturbances at the intermediate half-century points. On a much larger time-scale, Lee[12] detected rhythmical processes in the disturbances recorded in the history of China Richardson[13] studied the relation of outbreaks of organised violence to density of population and length of frontier and also analysed some very remarkable statistical facts about the psychology of preparation for war he found, for example that there was no appreciable correlation between preparedness and subsequent suffering in the first world war Richardson also examined the phenomenon of the arms race if the amount of national income spent on armaments represents the quantity of ideas, in the population of fear and suspicion of potential foes, the arms race clearly resembles a crowd epidemic in its phase of exponential increase Penrose hopes that the study of warfare from the epidemiological point of view may offer some hope for the future

THE RIGHT TO KNOW A RISK

"BOY DIED AFTER INOCULATION FATHER SAYS PARENTS MUST BE WARNED OF DANGERS

THESE headlines in the *Beckenham Advertiser* of Dec 20 refer to the death of a 10 month-old child two days after being immunised against diphtheria. The coroner's pathologist, it was stated had certified that the baby died from bronchopneumonia and an inquest was not thought necessary The newspaper however reports the parents' belief that the injection of anti-diphtheria serum caused death,' and a clergyman supporting the father's protest quoted his own family doctor as saying that there is a remote but a real danger from all forms of serum injection to small children.'

There is, of course, some confusion here the risks of injecting serum are well recognised but the approved preparations currently used for diphtheria prophylaxis do not in fact contain serum Fatal or even serious illness directly attributable to these preparations is exceedingly rare if not unknown But the point that the parents make is that if there was any risk at all they should have been warned of it Quite apart from the facts of this particular case there is an important principle here and we side with every parent who, before consenting to a medical procedure for a child, wants a full explanation of what possible harm as well as what good, it may do Exactly the same principle is involved when an adult patient in hospital is asked to consent to a diagnostic procedure carrying a danger of which he knows nothing or even entailing pain or discomfort about which he has not been warned Indeed it is improper that he should be expected to submit to any unexplained procedures at all The practice of arriving without warning at the bedside and mutely embarking on some technique which is unfamiliar and alarming to the patient is now unfortunately common and getting commoner The patient has a right, in every such case, to a reassuring explanation *given beforehand* by the consultant in charge of the case or by his houseman and to a direct request for his consent. To deny him this right is not only bad medicine but smacks of totalitarianism

Inoculations to prevent or modify smallpox, measles, diphtheria, whooping-cough tuberculosis typhoid influenza tetanus, and other diseases are administered to thousands every year and thousands of lives are saved by them But some of these procedures are on rare occasions and in special circumstances—not usually predictable—followed by pathological reactions Ulceration at the site of injection, or abscess of the regional lymph glands, may follow B C G vaccination An injection of whooping cough vaccine or of diphtheria prophylactic given to a child incubating poliomyelitis may determine the site of paralysis, and perhaps increase the degree of it Postvaccinal encephalitis is still occasionally seen Infective hepatitis is a rare complication of measles prophylaxis.

We have always held that these risks should be clearly explained[1] It is easy however to understand why the staffs at the clinics have hesitated to do this as the Beckenham clergyman puts it 'they have a kind of conspiracy of silence because they are frightened of starting a scare' We believe on the contrary, that a frank explanation of any risks always promotes confidence and puts parents in the right position to decide whether they want to accept or refuse the proffered protection for their children and it should not be difficult to include a brief and accurate account of these risks on the printed consent form Now and then it must happen —as seems to have been the case at Beckenham—that an immunised child will develop some intercurrent disease entirely unprovoked by the antigen but becoming manifest soon after the injection It is perfectly understandable that the parents should associate the illness with the immunisation and so a reputable procedure may be maligned and the parents may suffer painful and misplaced regrets. It is then the task of the family doctor to explain to them clearly that the two events are not associated.

LARYNGEAL SWABS

THE laryngeal swab was used for demonstrating tubercle bacilli in bronchial secretions as long ago as 1905[2] but it was not until nearly forty years later that the delicacy of this method was compared with that of gastric lavage.[3] Since then there have been several comparisons[4–7] and these suggest that a single laryngeal swab is less reliable than a single gastric lavage but that three swabs are more reliable One worker however reported that one laryngeal swab gave twice as many positive results as a gastric lavage[8]

The two methods have now again been compared and the laryngeal swab has once more been found the better[9] A different technique was used for culturing the swabs, with a liquid instead of a solid medium[10] Tubercle bacilli were grown from at least one of three swabs or from the stomach contents in 204 patients in 48% of these the gastric lavage was positive; but in 60% a single swab was positive and in 92% at least one of three swabs yielded tubercle bacilli In 8% however all three swabs were negative although tubercle bacilli were found in the stomach contents. The most rigorous test to exclude the presence of tubercle bacilli seems to be a combination of both methods. Of the 204 cases found positive by this combination only 99 would have been judged positive by one gastric lavage, and probably without either of these methods almost all would have been judged "sputum negative" Direct examination of sputum is indeed a crude test of infectivity and of the course of the disease, tubercle bacilli have been grown from 30% of 505 specimens of sputum that were negative on direct examination, even after they had been concentrated [11] Culturing has been criticised as too slow a process A negative result cannot be reported for at least six weeks, but in about three quarters of the positive cultures detectable growth appears by the end of three weeks, and the proportion will probably be only slightly less with cultures of laryngeal swabs or stomach contents [5] Obviously the more bacilli that are inoculated on to the medium the more rapidly can the clinician learn the result, and possibly in patients with little sputum a report could be made more quickly by culturing laryngeal swabs.

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[11] Wright, Q A Study of War Chicago 1942
[12] Lee J S China J 1931
[13] Richardson, L. F J Amer stat Ass 1948 43 523; Eugen. Rev. 1949 42 25

[1] See Lancet 1949 ii, 659
[2] Blume C A. Hospitalstidende 1905 13 557
[3] Gad U De Linde B Acta. tuberc. scand 1944 18 89
[4] Clark K. C Hart, P D A. Kerley P Thompson, B C Spec Rep Ser Med Res Coun. Lond. no. 251 1945
[5] Hounslow A. G Usher G Tubercle 1948 29 [illegible]
[6] Forbes, G B. Smith, B J D Harford J V., Springett V H Lancet, 1948 ii, 141
[7] Duggan, M. Delamater L Canad. med. Ass. J 1950 62 54.
[8] Gilje A. Nord Med 1948 40 1905.
[9] Armstrong A R. Canad. med Ass. J 1951 65 575
[10] Armstrong A. R. Foster E. D Canad. J med Tech. 1951 13 103.

Both the "gastric lavage" and the "laryngeal swab" methods are inaccurately named The former is commonly not a washing-out but merely an aspiration of the fasting stomach contents containing swallowed bronchial secretions, and with the latter method the pharynx, epiglottis, or pyriform fossæ are swabbed more usually than the larynx Perhaps, however, the term "laryngeal swab" should be retained to indicate to the operator what is desired of him It would be interesting to compare the results of deliberate pharyngeal swabs and of true laryngeal swabs Gilje [8] has suggested that such swabs should be taken before breakfast, but comparison with swabs taken at other times of the day shows that the early morning one gives no better results [9] Even if a single laryngeal swab taken by an inexperienced operator and cultured by an indifferent technique should be less accurate than a gastric lavage, it seems that three swabs might be superior to one gastric lavage, and certainly all but professional sword-swallowers would prefer to have the throat tickled three times a day after meals than to swallow a stomach-tube before breakfast

CAT-SCRATCH FEVER

La maladie des griffes du chat can now stake a claim for inclusion in the textbooks There need be no unseemly squabble for priority in discovering this "new" disease, for there is little doubt that it was recognised in 1947 during conversations between Debré of Paris and Foshay of Cincinnati Here, in fact, is a signal advertisement for the professional coffee housing which is sometimes denigrated as mere gossip

During the previous twenty years both these workers had seen examples of a benign but usually febrile illness which followed the scratch of a cat, and of which the presenting sign was an apparently sterile suppurative adenitis On the analogy of the Frei test for lymphogranuloma inguinale Foshay had prepared from the pus an antigen which gave an intense intradermal reaction in his patients On his return to France Debré, using his colleague's antigen, produced similar results in his own patients As so often happens, when these things became known, others recalled similar cases,[12] and the disease has now been reported from several places in the U S A, from India, and repeatedly from France [13] Like other ailments it seems commonest where it is looked for The clinical picture varies from the classical regional adenitis to forms resembling lymphogranuloma inguinale, to ocular infections, and to eruptions of the skin [14] Knowing the long time that such intradermal reactions persist, we must be cautious in accepting Foshay's test alone as diagnostic, but the general uniformity of the reported cases in history, course, and response to treatment convinces us that this is a disease sui generis Scratches from a cat do not always form part of the history (one woman is reported to have derived her infection from sniffing a cushion soiled with feline urine), but they are associated with the disease far more often than would seem likely by chance

Histologically the glands somewhat resemble those in lymphogranuloma inguinale, but the histological picture has proved distinct enough for diagnosis by this alone. In no case has bacteriological examination of the pus given a clue to the ætiology A superficial resemblance to tularæmia was not confirmed by agglutination reactions, Frei and tuberculin tests have been negative A complement-fixation test using as antigen lymphogranuloma inguinale virus, from egg culture gave inconstant and confusing results Transmission to volunteers was successful in one out of four, inoculation of apes was more successful and caused a disease like that in man [15] No "take" followed inoculation of other animals, including cats A guess at the infectious agent is premature, but a virus of the lymphogranuloma psittacosis group seems possible

If we allow that this is a "new" disease two questions need to be answered Is it a feline disease transmitted to man, or is the cat a mere vector? Has it arisen de novo during our lifetime, or has its recognition waited on the pertinacious curiosity of Foshay and Debré? Mollaret, who has added much to our knowledge of this disease, inclines to the view that since it cannot be transmitted to cats the infection reaches man from some other source, but usually on the claws of a cat Birds are an obvious surmise, though attempts to infect birds have been unsuccessful The difficulties of detecting Q fever in the cow—which seems to be the source of most human infections—suggests that this animal deserves further investigation Again, if the disease has in fact been derived from cats, has there been any recent change in feline habit or diet (in Cincinnati as well as Paris) which might account for the invasion of a new host? We do not know, but an old lady tells us that in her eighty years she has seen a great change in the man-cat symbiosis In her youth puss slept in the straw and not on her owner's bed "Natural" antigens are hard to obtain and to standardise, but if sufficient can be had it would be worth while to survey the number of positive reactors among those of our veterinary colleagues who have "small animal" practices And now that a susceptible (though costly) animal is available it should be possible to obtain more direct evidence of infection in the cat and its fomites

Cats have probably scratched man since the Fourth Dynasty, and glandular enlargement to the size of an orange cannot have escaped earlier observers We think that this must be a new disease arising from a change in habit either of the parasite or of one of its hosts We leave to our ambitious registrars the distinction of recording the first infection on English soil.

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[11] Meyer A, Galland, R, Kobrinsky, B *Rev Tuberc* 1952 15, 932

[12] Daniels, W B, MacMurray, F G *Arch intern Med* 1951, 88, 736

[13] Debré R, Lamy, M Jammet M L, Costil L Mozziconacci, P *Bull Soc méd Hôp Paris* 1950 66 76 see *Lancet*, 1950, ii, 812 Greer W E R Keefer C F *New Engl J Med* 1951 244 545 Mollaret, P, Reilly, J, Bastin R, Tournier P *Pr méd* 1950 58 1353

[14] Duperrat B *Bull Soc méd Hôp Paris* 1951 67 848 Clement, R Combes Hamelle, A, Meyer B *Ibid*, p 1108 Weill J, Blas, F *Ibid* p 1141

[15] Mollaret P, Reilly, J, Bastin, R Tournier, P *Pr méd* 1951, 59 681, 701

THE next session of the General Medical Council will open on Tuesday, Feb 26, at 11 A M, when Prof DAVID CAMPBELL will take the chair The Medical Disciplinary Committee will meet at 2 P M the same day and will sit daily until their business is finished

Special Articles

A CHRONIC SICK UNIT

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IN April, 1950, a chronic sick unit was established as a separate department with its own medical staff at Withington Hospital, Manchester The unit was assigned 60 beds in the general hospital and 400 beds in an adjoining annexe. Over 100 patients were on the waiting list, and all the beds were occupied As there were other chronic wards in the hospital more suitable at that time for treating patients with confirmed incurable carcinoma these patients were excluded as a general rule, but patients with any other type of chronic illness were accepted

BASIC NEEDS

It was considered that the first essential needs were

1 To reduce the size of the waiting list and the long delay before patients were admitted

2 To establish a system of admission by need rather than by date of application

3 To provide more active medical care than before

and the following steps were taken to implement this programme.

Home Visits

When a request for admission was made the patients were first visited in their own homes by the consultant physician and a hospital almoner and it was found that 28% of them did not really need inpatient treatment, if full use was made of the other available health services, such as local health services, other statutory help, the hospital outpatient department, and voluntary services In practice however it was impossible to provide complete services for so many so finally only 22% were not admitted to hospital.

Some of these patients had been referred to hospital only because their general practitioners were not aware of some of the services available. For example patients had been referred for admission when in fact they required accommodation in a hostel providing care and attention rather than medical treatment Grants from the Assistance Board and the provision of district nurses and home helps enabled relatives to nurse some sick people at home. It was also found that the doctor had sometimes requested admission without discussing this with the patient or with relatives, and when a visit by the hospital staff was made it was discovered that the patient refused admission

Close contact between general practitioner and hospital staff with exchange of information is thus clearly useful. General practitioners found the home-visiting service of value because the responsibility for the non admission of patients immediately was shared with the hospital patients requiring urgent admission were treated as urgencies, and by reducing the size of the waiting list the waiting time of the remainder was considerably reduced

Admission

A policy was adopted of assessing the need for admission on both medical and social grounds and of deciding which patients should be admitted on a priority basis. This was a difficult procedure but trial had shown how many beds were needed for the various groups of patients and admission was arranged for:

Those whose life could be saved or whose return to health would be jeopardised by non-admission.

Patients in distressing medical or social conditions.

Other patients were admitted after these priority groups and for them the date-order of application was generally followed except that any further information given by general practitioner health visitor, relative, or neighbour was considered and some patients were moved from the general group to priority groups Priority patients were admitted within a few days but inevitably some patients had to wait a long time, and some died before they could be admitted.

In hospital the patients were grouped into those needing active medical and other care and those needing nursing care only The original conception of admission wards through which all patients must pass was modified when it was found that most of the patients seen at home could be placed directly on admission into their correct wards Some observation beds were however kept for patients who could not be so classified before admission If there was doubt the patient was always placed in an active ward

ACTIVE MEDICAL CARE

The first essential for the successful treatment of the aged or the chronic sick is a full clinical examination with pathological and X ray investigations where needed. Some of our patients who had been bedfast for several months had no demonstrable pathological lesions They had either gone to bed on the advice of some well meaning person who told them to have a few days in bed where they had remained, or they had taken to their beds for psychological reasons.

One old lady for instance had been in bed for three months in the house of her daughter and nursed by her The daughter wanted her mother out of the house and the patient had responded by taking to her bed The patient was made fully ambulatory and able to care for herself when in hospital but her successful treatment depended on resolving her social difficulties

In caring for these patients a complete team is essential. Once a week on his ward round in the active wards, the physician should be accompanied by nurse physiotherapist, and almoner In this way members of the team become acquainted with different aspects of the problems of each patient and a coördinated scheme of treatment followed Other members of the hospital staff who also coöperate in treating these patients include the occupational therapist, chiropodist, voluntary workers with the library service, and the W V S with a travelling shop

Social medicine plays a large part in any unit of this kind and an efficient almoner s department is essential The hospital staff deal with the illness of a patient in hospital but they must also understand the social implications of illness and coöperate with local authority and voluntary agencies The patient cannot be divided into the artificial categories of the health service Organic illness is often a direct result of social circumstances. Many of our patients for instance were ill nourished

Emphasis must be laid on practical measures of rehabilitation and the danger of bed rest is stressed to all members of the staff and particularly to the nurses. The active ward is really active when most of the patients are out of bed at least for part of the day Simple apparatus in the ward is helpful. The old fashioned, high backed wooden armchair with a Sorbo seat can be used for ordinary sitting purposes and gives sufficient support to the patient, and it can also be adapted for muscle exercises by the use of simple springs. Parallel bars and a set of steps such as are found in physiotherapy departments are also very useful. With this apparatus physiotherapy and re-education in walking can be continued throughout the day and every day and not limited to a few visits each week to a physiotherapy department It is of advantage for the unit to have its own physiotherapy staff

A consultation clinic is held in the outpatient department for new patients, and there is a follow-up service, but this service is kept to a minimum, for after discharge we feel the family doctor should be responsible for the patient's medical care and the local authority for his social care Usually a patient who has been treated for a heart condition is seen once after discharge, and patients attending the hospital for treatment such as physiotherapy, or for blood counts, are seen regularly

A YEAR'S RECORDS

Records were kept of all the work done in the unit, but it was not until July, 1950, that they were standardised The following figures are for the period July 1, 1950, to June 30, 1951

Home Visits

Of the 677 patients who were visited in their homes 529 were accepted for hospital inpatient care Of the 148 patients who were not accepted 37 were referred to a local authority, 98 remained in their homes, and for the remaining 13 other accommodation was found

Of the 529 patients accepted for hospital 371 have been admitted as beds became available, 10 were still awaiting admission Of the 148 who have not been admitted 94 died, 11 refused admission, 19 were admitted elsewhere, and 24 recovered

Other patients who had not been visited at home were accepted for admission, either as urgencies or because staff was not available to visit them, and the total waiting-list at the end of the period was 20 During the year the number of beds had been reduced by 13 to provide sitting accommodation for the increasing number of up-patients

Home Conditions

It was found on visiting the 677 patients that 85% lived in private houses, the others in lodgings, nursing-homes, hostels, or other hospitals In all, 193 patients (28%) lived alone or depended on neighbours or relatives coming from a distance, 47 were without any help at all

Physical State

When visited at home the patient or relatives were asked about incontinence, and it was reported that 123 patients (18%) were incontinent Although incontinence was treated as a priority condition for admission, 53 of these patients were not admitted, probably because they were thought too ill to move or because during the influenza epidemic early in the year there was considerable delay before admission Of those admitted to hospital 40 died, 9 were discharged, and 12 remain in hospital

Waiting time

The waiting-time before admission for the 371 patients was as follows

Days	*Patients*
1-10	204
11-20	91
21-30	32
31-40	12
41-50	12
51-60	5
61-90	11
Over 90	4
	371

Age-groups

Besides the patients seen at home, a further 243 were admitted either as urgencies or because there had not been time to visit them The total number of admissions was therefore 614, and an analysis of these patients showed that the majority were between seventy and eighty-five years of age Table I was compiled three months after the close of the period under review It shows that 86% of the patients were over sixty-five years of age and 93% were over sixty At the time of writing, 30% had been discharged, 40% had died, and 30% remained

TABLE I—AGE GROUPS IN RELATION TO DISCHARGE OR DEATH

Age in years	Discharged	Died	Still in hospital	Totals
20–29		2		2
30–39	2		2	4
40–49	7	1	1	9
50–54	1	2	7	10
55–59	7	5	5	17
60–64	26	7	12	45
65–69	36	30	24	90
70–74	43	48	42	133
75–79	37	68	46	151
80–84	18	53	35	106
85–89	5	19	12	36
90 and over		6	5	11
Totals	182	241	191	614

Length of Stay

Table I does not show how long patients stayed in hospital, and therefore an accurate estimate as to probable discharge or death cannot be obtained It will be seen from table II that discharges and deaths can be considered probable for about six months after admission

To obtain a more accurate estimate as to the length of time spent in hospital the figures for the six month period July 1 to Dec 31 have been taken During this period 175 patients were admitted who had been seen at home and 106 patients were admitted directly, giving a total of 281

TABLE II—LENGTH OF STAY

Stay in days	Discharged	Died	Still in hospital
1–28	43	144	51
29–56	54	36	26
57–84	42	17	19
85–112	18	18	33
113–140	10	11	19
141–168	5	4	6
169–196	6	6	7
197–224	1	2	5
225–252	1	1	5
253–280	1	1	6
281–308			5
309–336		1	3
337–364	1		6
Totals	182	241	191

The discharge rate was 37 7% of those admitted and the death-rate 50 8% It is interesting to speculate on the length of time the 11% will remain in hospital, for previous surveys have shown that patients can remain a long time For example, a survey of the hospital chronic sick annexe before the present methods of treatment showed that of 390 patients 32% had been in hospital for longer than five years, 12% over ten years, and 8% over fifteen years

CONCLUSIONS

A specialised unit can prevent long continued hospital care of a substantial proportion of patients The waiting time for admission can be reduced, much suffering can be alleviated, and many patients can be restored to health By such means the number of beds needed in hospitals may possibly be reduced

Such a unit offers an unusual opportunity to teach social medicine, for it brings the hospital staff into intimate contact with the homes of patients Many of the problems and illnesses of the chronic sick are social in origin

This service will tend to bridge the gulf between hospital, public health service, and family doctor, for all must help if the patient is to be successfully treated

THE NEW N H S CHARGES

UNDER the Bill introduced in the House of Commons last week (see p 307) and the Acts of 1946 to 1951 it is proposed to issue regulations giving effect to the charges in the National Health Service proposed by the Chancellor of the Exchequer

HOSPITAL APPLIANCES AND DRUGS

A fixed flat-rate charge is to be made for certain appliances—including surgical boots or shoes surgical abdominal supports, elastic hosiery, wigs, and hearing aids and batteries—supplied through the hospital service to outpatients, and a charge of the full cost of repairs of surgical boots, &c., undertaken through the service No charge will be made for appliances supplied to or repairs done for, children under 16 or in full time attendance at school; people (or their dependants) who are receiving National Assistance; and war-pensioners with an accepted disability Others who would find it hard to meet the charges will be able to apply to the National Assistance Board for help These charges are expected to *save just under £500 000 a year*

Outpatients will be charged 1s for prescriptions for drugs and medicines. Persons receiving National Assistance and war-disabled pensioners will not be charged This charge is expected to save about £500,000 in a full year

AMENITY BEDS

It is proposed to double the present charges for 'amenity' beds. The new charges will be *half the cost* up to 12s a day for a single room and a quarter of the cost up to 6s a day for a bed in a small ward In a full year these charges should save about £200,000

IN GENERAL PRACTICE

A charge of 1s will be made for each prescription form issued by a family doctor A form may contain more *than one* prescription *Charges of 5s to 10s will be made* for elastic hosiery (This charge will be the same as the hospitals will make.)

People in receipt of National Assistance will be able to claim repayment for themselves or their dependants from the office where they draw their assistance, usually the post-office, when next presenting their order-book if they produce a receipt from the chemist or dispensing doctor War pensioners will be able to reclaim charges incurred by reason of their war disabilities. Other claims should be made to the National Assistance Board The charges will be payable by everyone who presents a prescription form to a chemist, or in rural areas is supplied with medicine by a doctor who does his own dispensing The chemist will be able to ask for the charge before supplying the medicine The remuneration paid to chemists by the local executive councils will be adjusted to take account of the charges *payable* by patients. Drugs supplied in an emergency by a doctor or dentist will not be subject to the charge These charges are expected to save just under £12 million

DENTAL CHARGES

A fee of £1 or the full cost if less will be charged for dental treatment. This is in addition to the charges for dentures already payable Where *both treatment and* dentures are provided the total cost to the patient must not exceed the present maximum of £4 5s The charge will apply to treatment by a general dental practitioner in his own surgery or in a health centre. It does not apply to hospitals. It will be paid by everyone except children who are under 16 or are still at school expectant mothers, or mothers who have had a child within the last twelve months. These mothers and children will continue to be entitled to free treatment from general dental practitioners and under the local authorities priority services. The charges will be paid direct by the patient to the dentist. Mothers and children who claim exemption will have to sign a declaration that they satisfy the conditions laid down Patients who cannot meet the charges without hardship will be able to get help from the National Assistance Board The charges will, it is hoped save about £7½ million a year

Public Health

Tuberculosis in a Metropolitan Region

THE ways in which the control of tuberculosis is *attempted in the different regions illustrates the national* taste for variety In Leeds, as we have seen [1] a panel of doctors was convened to review the facilities in the region and plan improvements with the result that many former dispensaries have been taken into hospitals, X ray equipment has multiplied and three admission bureaux have been set up under the direct control of the senior chest consultants in the areas In the Buckinghamshire area of the Oxford region [2] a small chest team, with 27 beds for short term treatment and a supply of unusually good chalets for patients receiving domiciliary care, are seeing a rapid decline in the tuberculosis death rate and a rise in the age of death In Middlesex domiciliary treatment has been effectively developed, the chest physicians having at their disposal hospital beds for the admission of early cases needing collapse therapy or other initial surgical measures.

EARLY TREATMENT CENTRES

In the South East Metropolitan region, spreading over much of south London all Kent, and east Sussex another form of attack has been devised The special object has been to give the early cases early sanatorium treatment and a determined drive centrally organised, has reduced the time of waiting for admission to 2–3 weeks for this type of case Early cases for which something can be done have deliberately been given first consideration the problem of the chronic infective case has still to be solved here as elsewhere. Some 390 beds in the region have been set aside *for early* treatment grouped in three centres—at Kettlewell Hospital, Swanley Bevandean Hospital, Brighton and Bow Arrow Hospital, Dartford The first of these is a sanatorium formerly taking both advanced and early cases, the second took some cases of tuberculosis and some of infectious disease, and the third took infectious diseases only all three are now entirely given up to early cases of tuberculosis. They are fully equipped with X ray plant and operating theatres, and are under the charge of consultants in chest diseases; thoracic surgeons pay regular visits.

By March 1 1951 all three of them were in action, and they admitted 804 cases between them up to the end of the year The average period of stay is about 3 months, *but this is flexible An important aim of* sanatorium treatment is to teach the patient so to live with his disease that he shall never be a danger to others and the technique can hardly be acquired in less than 3 months indeed it needs an intelligent and coöperative patient to become expert and permanently reliable in the routine even in that time. The patients, then are admitted as soon as possible after the diagnosis has been made, are given any initial minor surgical treatment indicated or treated with modern drugs, and are taught their duties to others. When they go home their domiciliary treatment is under the management of the physician at their local chest clinic, who gains the collaboration of the family doctor These arrangements for early treatment have reduced the regional waiting list from 1606 on June 30 1950 to 604 at the end of 1951 Both men and women can now be admitted in 2–3 weeks, and special priority is given to any urgent case The better provision for early cases has naturally released some beds for chronic and advanced cases.

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[1] *Lancet*, 1951 i 1304
[2] *Ibid* ii, 33.

DRUG TREATMENT IN THE HOME

Domiciliary treatment in this region has naturally been influenced by the new situation Chest physicians at the clinics no longer feel obliged to attempt collapse therapy in the home while the patient is waiting for a sanatorium bed, and hence feel less keenly the lack of acute beds under their personal care The induction of collapse therapy in the home, or during a short stay in a general hospital, though it has been widely accepted as an emergency measure, and has proved highly successful in able hands, inevitably carries risks and has never been the method of choice Clinic chest physicians in the South-East Metropolitan region are probably relieved on the whole to see the occasion for it pass

At the end of his period in one of the centres for early treatment the patient is usually able to return to his home, under the care of his clinic chest physician [illegible] Only about 1 in 10 is found to need further sanatorium treatment Chemotherapy can of course be carried on at home, and the chest physician gives any necessary pneumothorax refills at the clinic and checks the patients' progress radiographically If he thinks further inpatient treatment is necessary he can recommend admission to a sanatorium Admission to sanatoria in the region, as well as to the early treatment centres, is arranged centrally, in order to ensure a constant flow of cases, but this does not prevent chest physicians, when they want to arrange the immediate admission of some particular case, from approaching directly the chest consultants in charge of the early treatment centres, and any arrangement made in this way is merely confirmed at the regional board headquarters An effort is also being made to link chest clinics with individual hospitals, so that groups will be formed in which the doctors know one another personally

Chest physicians are being encouraged to pay regular fortnightly or monthly visits to their patients undergoing early treatment, and to consult with the medical superintendent, the chest physician, and the thoracic surgeon at the centre It is thought that they will thus keep themselves well informed about each patient's progress, and the lines on which treatment should be continued on his return home

There are 47 clinics in the region, of which 26 are major clinics, situated in good—or relatively good—quarters, 5 of the major and 4 of the minor clinics are in hospitals, and 13 of the major and 3 of the minor clinics have X-ray equipment, in addition, 5 clinics have screening sets Where no set is available patients needing refills attend the nearest hospital with X-ray equipment Some of the clinic premises are inconveniently small for the volume of work, and some have to be shared with other specialties thus one clinic becomes the hospital X ray department on two afternoons a week, another shares its quarters with a weekly diabetic clinic, and another surrenders a room once a week to a class of pregnant women learning to relax Though there are quite cogent objections to such arrangements, they have to be tolerated while accommodation remains so scarce Clinics with particularly poor quarters have been transferred, whenever possible, to hospitals, with great gain to their efficiency In the main the clinics of the region are pleasant and cheerful to visit and well suited to their purpose—for which some of them, indeed, have been built If the region as a whole has not, perhaps, quite that atmosphere of fermenting personal enterprise found in some others, yet it shows what can be done with existing machinery when this is cleaned, oiled, and geared to its task by competent engineers It also shows that, even with our present limited resources, it is possible to arrange prompt treatment and adequate training for early cases, a policy we have advocated for several years[3]

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3 *Ibid*, 1949 ii 1225

Births and Deaths in 1951

According to provisional figures announced by the Registrar-General,[1] infant mortality in England and Wales continued to fall in 1951, the rate was 29 6 per 1000 related live births, compared with 30·0 in 1950 The birth-rate was 15 5 per 1000 population, compared with 15 8 in 1950 Stillbirths amounted to 22 9 per 1000 live and still births (22 7 in 1950) The death-rate was 12 5 per 1000 population (11 6 in 1950)

Estimate of Births

The Registrar-General's[2] final estimate of live births in England and Wales during the quarter ending March 31 is 173 000, and his provisional estimate for the quarter ending June 30 is 174,000, making a total of 347,000 in the six months In the corresponding six months last year births totalled 357,257

Scotland in 1949

In his final report on the year 1949,[3] the Registrar-General for Scotland remarks that the infant-mortality rate of 41 per 1000 related live births was the lowest ever recorded The death-rate was 12 3 per 1000 population—0 5 more than in 1948 Figures for the infant-mortality and stillbirth rates according to the social grade of the father show that this grade has a strong bearing on infant mortality and to a less extent on stillbirth

An Ambulance Service Aided by Radio

In Leicestershire radio equipment has been installed in all ambulances, and in his report for 1950 Dr G H Gibson, the county medical officer of health, remarks that this system has proved indispensable

Each ambulance has equipment enabling the driver to carry on a two-way conversation with the controller at the ambulance headquarters in Leicester Messages are picked up and transmitted by an automatic station at Copt Oak and carried by telephone line to the headquarters Except for one or two small areas, reception is good over a radius of more than 25 miles The movement of vehicles can now be controlled more efficiently, and the ambulance crew is no longer isolated when on the road with a difficult patient, such as a maternity case Other examples of gain from the new system have come to light

> "One which might be quoted is that of an urgent call to a maternity case On arriving the driver was informed by the doctor that the patient could not be moved until she had a blood transfusion There being no telephone available, the driver radioed a request for the Emergency Transfusion team and they were immediately sent out by the hospital who were informed by the ambulance control"

The financial saving is said to be considerable Basing the cost of equipment on a five years' life, the annual saving is computed at about £3000 after this cost has been met

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1 Registrar-General's Return for the Week ended Jan 19, 195
H M Stationery Office Pp 20 1s

2 Registrar General's Return for the Week ended Jan 26, 195
H.M Stationery Office Pp 20 1s

3 H M Stationery Office 8s

Infectious Diseases in England and Wales

Disease	Week ended Jan			
	5	12	19	26*
Diphtheria	46	33	22	27
Dysentery	205	316	434	517
Encephalitis				
Infective	2	1	2	4
Postinfectious	1	2	1	2
Food poisoning	300	136	123	90
Measles excluding rubella	3491	2840	2828	2837
Meningococcal infection	40	51	35	37
Ophthalmia neonatorum	24	34	36	30
Paratyphoid fever	6	3	6	10
Pneumonia primary or influenzal	976	1058	869	835
Poliomyelitis				
Paralytic	18	33	25	16
Non paralytic	7	3	10	9
Puerperal pyrexia and fever	197	247	232	207
Scarlet fever	1104	1055	1311	1295
Smallpox				
Typhoid fever	2	3	4	3
Whooping cough	2155	2304	2349	2573

* Not including late returns

Parliament

Effects of Economy Cuts on the Health Service

THE charges on parts of the National Health Service outlined in the Chancellor's statement on Jan 29 were criticised in the debate which followed

Mr. **HUGH GAITSKELL** the former Chancellor of the Exchequer did not believe that hardship had been caused by the charges which he had imposed for dentures and spectacles. Those charges did not attack people who were ill in the ordinary sense of that word Last year one of the arguments which had led the Labour Government to impose the part charge on dentures was that it would leave the dentists more time for preventive work. The present Chancellor was discouraging people from going to the dentist to save their teeth It was all very well to say that the children's teeth would benefit when the Minister of Education had dealt with the local authorities who were misbehaving but if so how was it expected to save £7½ million? It was difficult to see why there should be any saving if the dentists were to do the same work on the children As to the shilling charge on prescriptions, the Labour Government had dropped this proposal largely because of the administrative difficulty when old age pensioners were exempted He had no doubt that was why the present Government were not exempting old age pensioners. The prescription charge created a new situation It was being imposed upon people who were sick and might find themselves in a state of great hardship

Mr **CLEMENT DAVIES** leader of the Liberal Party did not approve of the shilling charge on prescriptions Did Mr *Butler* really think, he asked that such charges could best be borne when there was sickness in the house and there was probably less money available and more money was needed for things which were not normally required? This was the first retrograde step since 1911 when the first national health service was introduced It was estimated that the charge would save £12 million out of a total of £400 million. If Mr Butler wanted to save £20 million he should rather look at the administration of the National Health Service, where he might find a great deal of waste and unnecessary extravagance Economies in that direction might improve the service at any rate they would not put a charge upon anybody who could ill afford it.

Mr **ARTHUR BLENKINSOP** the former parliamentary secretary of the Ministry of Health, said that the unfortunate cuts which he and his colleagues had to make in the health service last year were more than balanced by increases in other parts of the service. They were made on the advice of the advisory committee to the health service as being desirable on other than monetary grounds. The charge for dental treatment as distinct from new dentures, was a serious blow at the preservation of the national health The proposed charge on appliances, especially hearing-aids was mean and contemptible The Labour Party was bitterly opposed to the prescription charge. They had proposed it a year ago to try and correct the abuse in the provision of drugs and medicines. But it became clear that though it might deter a small minority it could not be applied without overwhelming hardship to a vast number of people. It would make it difficult for doctors to establish an early diagnosis. What was needed was to make it more possible for the doctor to give an honest judgment as to needs and that involved the consideration of revision of the method of payment to medical practitioners.

Mr **C R. ATTLEE** pointed out that when his Government proposed to make charges on parts of the N H.S they were actually increasing the amount going to the social services. But it was a question of how to spread the money available They wished to spend more on hospitals and less on other things. They also wished to restrain abuse People were taking up the time of doctors who ought to be better employed and were getting all kinds of things which were not strictly curative. For this reason his Government had proposed a charge on prescriptions, but they had found it would mean a great deal of work for the doctors and hardship to many patients. So instead they set up the Cohen Committee, who excluded from the substances which could be prescribed many things which were not drugs. The new measure was not introduced to correct an abuse or to correct a balance between different parts of the social service but for some extraordinary reason as a means of dealing with our overseas payments

Mr **ANEURIN BEVAN**, the former Minister of Health, said that of all the mean and contemptible things to do the attack on the health service was the worst. The £1 dental charge would add to the number of applications for public assistance and necessitate more staff more interrogation, more humiliation, and more means tests, for the sake of saving a miserable number of pounds There was nothing in the internal financial situation which justified these charges The N.H.S was now being crippled not only by the direct charges but by preventing it from normal expansion by preventing the ceiling being raised when the cost of living was going up

Mr **H. F C CROOKSHANK**, winding up the debate asked must the only standard be the total money spent No vast scheme like the N H.S could be right in all its parts from the beginning By putting on charges we should incidentally get a better balanced scheme, and if it happened to be cheaper it was not necessarily bad on that account. The Government were trying to get the priorities right. The consumption of medicines for instance had become enormous in scale and Mr Attlee had admitted that there were cases of abuse In 1947, when it was only the insured persons who could be referred to statistically the number of prescriptions per annum per insured person was 3½ Now with the whole of the population included it was over 5 The number of prescriptions in the last three years had gone up from 202 million to 217 million and now to 229 million, and the total bill for prescriptions was over £50 million a year

The New National Health Service Bill

Of the economies in the National Health Service proposed by the Chancellor the charge on prescriptions from general practitioners for drugs and appliances and the additional charges for amenity beds can be implemented under the National Health Service (Amendment Act) 1949 On Feb 1 Mr **CROOKSHANK** presented a Bill to give effect to the other new charges. The Bill applies to Scotland but not to Northern Ireland and it will come into force seven days after the passing of the Act. The Bill is being read a second time on Feb 7

The new measure will enable regulations to be made extending the charge for drugs to hospital outpatients —hospital inpatients are excepted Outpatients may also be charged for appliances and for the replacement and repair of appliances. The amount of the charges is not included in the Bill and will be prescribed by regulation Power is also given to remit the charges for certain classes of people to be prescribed

The Bill provides that a charge of the authorised fee or £1, whichever is less, may be made for dental treatment, other than the arresting of bleeding caused by the extraction of teeth There already is a charge for the supply or replacement of dentures, and bridges are now also to be chargeable Children, expectant mothers, and women who have borne a child within the previous 12 months are exempted from this charge except where it is for alterations to dentures. In a full year it is estimated that the saving to the dental services for England, Wales, and Scotland will be about £7½ million

The Bill also permits the charges for dentures and glasses authorised by the 1951 Act, to be varied by order in council but any increase must be approved by a resolution of both Houses.

Local health authorities are given power to make charges for the use of day nurseries according to the means of the parents

Anyone who evades these charges will be liable to a fine not exceeding £100 and/or up to three months' imprisonment

Health and Nutrition

ON Jan 20 Lord DOUGLAS OF BARLOCH said that notwithstanding the increase in the expectation of life, he doubted whether people enjoyed good health during their longer life According to the Official Survey of Sickness published by the Registrar-General nearly 70% of the people interviewed during 1946-50 had suffered from some sickness during the course of a month The number of days of incapacity averaged about 100 per month for every 100 people interviewed Only about two-thirds of those who suffered from some sickness consulted a doctor The general picture to be drawn from the survey, Lord Douglas claimed, was that lack of knowledge and neglect of health in early life paved the way for chronic and incurable illness in later years Unsuitable and deficient diet, in his view, was the main cause of susceptibility to illness He did not advocate that people should be obliged to eat whole-wheat bread, but he pointed out that the Government put pressure upon them to eat white bread, by subsidising the production of white flour, made still whiter and more unsafe by being bleached with 'Agene,' while whole-wheat flour and bread received no financial assistance

Lord CHORLEY said that over the last 200 years we had built a magnificent and beneficent science of medicine aimed at curing illness and disease, and so much skill, intelligence, and wealth had been put into that machine that it had become almost a sort of vested interest. In consequence we had no energy left to put into the more important problem of prevention. Even the National Health Service had developed a definite bent towards curative medicine as opposed to positive health Unless that service was given a new orientation soon it might turn out that in a sense it would become a curse in disguise rather than a blessing According to an estimate by the *British Medical Journal* £5$^1/_2$ million a year was spent on unnecessary bottles of medicine If this money were spent on vitamin tablets Lord Chorley believed it would make a difference to the health of the community, but if our population could be provided with the right food, properly cooked, there would seldom be any need for supplementation by vitamins He suggested that a proper research council on drugs and dietetics generally was needed in this country It was almost impossible to get clear proof that the agenisation of bread was deleterious, but there was, he declared, a great deal of evidence of its danger, including the experiments of Sir Edward Mellanby on a large number of animals It seemed to him unfortunate that the present Minister of Health had made a statement to the effect that there was no danger at all No risks should be taken in this matter, it should be established beyond peradventure that the food of the nation was safe

Lord HANKEY suggested that national austerity offered us an opportunity to get rid of some of the evils that had grown up during the long era of luxury which culminated rather late in the concept of the Welfare State At present we had a cocktail over-smoking, cosmetical standard of living in which everyone wanted to live on wheels Was this not an opportunity to get away from the intolerable situation in which the teeth of the nation had been destroyed, millions of pounds had been spent on artificial dentures, and there had been prodigious expenditure on hospitals and costly medical services, and to build up a system of prevention of disease? He was all against trying to raise the extraction-rate of bread higher than the people would stand, but if people could be made to understand what an important element food was in maintaining good health there would soon be a demand for a higher extraction flour It was now difficult for real converts to get good wholemeal bread The Government ought to make a real effort to put this right.

Lord HORDER did not think that the day-to-day incidence of sickness was necessarily indicative of the basic state of health of the nation. A large number of people might be kept from work by a wave of incidence of a fairly benign virus infection, such as the common cold That would be registered as sickness, but no administration, still less any particular government, could be blamed for what was an act of God He thought that the basic state of the national health was good Not only were we living longer, but our children were taller, heavier, and sturdier than formerly What happened to the children was a good criterion of what was happening to the national health in the basic sense, and infant mortality was never so low as today Lord Horder was satisfied that no nervous complaint prevalent in this country could be traced to the use of agene He thought Lord Chorley was confusing the danger that might derive from the use of agene in man, and the danger indicated by what could be produced experimentally in dogs Alternatives to agene were under consideration, but sound science, adding to wisdom as well as knowledge, was a slow process, and he pleaded for patience with the Ministries concerned

Lord HADEN-GUEST had no doubt that the health of the children of this country had greatly improved The children now growing up and in their teens were better developed than children were in the past

The Earl of Onslow, replying for the Government, said he was advised that no harm was known to be done to human beings by agene But the matter was being investigated and would be dealt with when another satisfactory improver could be found It seemed to him a little unwise to raise a scare about agene when there was no evidence that it was poisonous It was true that there had been an increase in heart-disease, but it was equally true that in New Zealand, where agene was illegal, the figures for heart-disease had risen progressively, and were higher than in this country The sickness survey included many trivial as well as serious ailments, and the real sickness rate was much lower He claimed that the high standard of the national health was largely due to the preventive measures which had gradually taken effect over the years The Medical Research Council were at present spending £1,626,000 on running expenses, and an additional £276,000 on building and special apparatus.

Tuberculosis in Scotland

Replying to the adjournment debate on Jan 20 on tuberculosis in Scotland Commander T D GALBRAITH, joint under-secretary of State for Scotland, was able to record encouraging progress In the first nine months of 1951 the deaths recorded were equivalent to an annual rate of 37 per 100,000, compared with 47 for the previous year Accepting this as the likely figure for the full year, the death rate had fallen in the last three years from 66 to 37 per 100,000 Notifications also showed a steady decline, and this despite improved means of diagnosis During 1950, 23,735 persons were tested with a view to B C G vaccination, and 4500 of them were successfully vaccinated In the first six months of 1950, 78 000 persons were examined by mass radiography in the same period of 1951 the number was 111,287 Further expansion of this service depended on medical staff, which at present was not easily obtained The percentage figure of active tuberculosis discovered in these examinations for 1950 was 6 and for 1951 was 4 During the last three years 1173 more beds had been provided, bringing the total tuberculosis beds at Dec 31 last to 5907 All but 280 of these beds were now fully staffed Waiting-lists for admission to hospital had been reduced from 2877 at the end of 1949 to 1700 at the end of 1951 180 beds had also been provided in Switzerland Last year the increase in tuberculosis nurses was 138, and the total number was now 1587

QUESTION TIME

Medical Students and National Service

In answer to a question Mr WINSTON CHURCHILL said that he was advised that part-time service under the National Service Act should not seriously inconvenience medical students completing their studies

In England Now

A Running Commentary by Peripatetic Correspondents

"Wet again isn't it ? He'll need a new surgery soon, dear *this doctor* *Look at the queue* *Don't know what* country's coomin to I blame t wireless for it—them hannouncers, they're not uman See that woman over there. Liver Hmmmm Joost a matter of time

"You never can tell, can ye ? There's my young broother Fine last week, gone now Bread Thas what did it. You've only got to look at it

"He's all against hypnotism, this doctor Jumped oop at hypnotism demonstration in Town All last Tuesday I can't repeat what he said here, dear They tried to throw him out. That's what ye get for being hindependant. Not hindependant in this coontry no more we aren't. Can't stand oop without cod liver oil Ye see it all round ye hevery day, dear Corroopt, that's us these days Medical Council can't save us, eether Better watch yer turn luv, can't trust no-one these hard times.

"Me kidney ? Oh it's fine But me varicose ! Ooo, it'll be end of me yet, that will. He's giving me mercury or summat. Aye, it helps He's got sooch a nice voice, this doctor has. Prob'ly a Sunday-school man, too Hethical, very hethical, 'e is.

"Wotever ye do, dear, don't let 'em Hex Ray ye It's woorse than purgatory, it is I'm tellin ye Ye wont laugh when they hask ye to drink that barium I'm tellin ye Your hour's coomin Have ye made yer will ? Ye haven't ? Humph, no hope for you ! Eo ! Here cooms doctor My artbreak. Sooch a nice man Even if he *is* married Ah, if only I was twenty years younger —I'd count oop to ninety nine all right ! Cascara for me again today, I suppose. Ah well moost pay for me sins soomtime mustn't I, eh ? Watch that nurse dear Uses blunt needles, she does Woman hater Ye can see it in her eyes ! Froosteration, luv Froosteration, plain and simple !"

* * *

How wise I was, when elected to the hospital staff, to rent a consulting room instead of trying to become a full-time consultant in the N.H.S It is hard to imagine how I ever *managed without its peaceful atmosphere,* essential for calm reflection defended from the harsh world by the diplomacy of my able receptionist the soft couch for one's afternoon rest, with an electric blanket to ensure complete relaxation the Van Gogh, bought *during the rush to prepare the room for instant* use ; and the freedom from worrying about how best to spend one's four-figure salary as a senior registrar This is a setting fit for a philosopher a dreamer, a peripatetic correspondent scarcely disturbed by the rare *intrusion of private patients seeking the touch of* my healing hand in return for their beastly money

* * *

One should never use methods which do not suit one's nature. As an aggressive and rather archaic means of forcing knowledge into unwilling heads the viva suits the nature of Anatomists ; and it was adopted by us Physiologists in an attempt to improve our results. The futility of this attempt was shown by one rather depressing student. At the end of his 15 minutes I had managed to convince him that his ideas about renal function had no relation to the simple facts presented in any textbook. He drew himself up from his chair summoning all the height he could muster leaned across the table and fixing me squarely with his hitherto lack lustre small brown eyes, said : 'If I have any misconceptions about the kidney I must have got them from somewhere, mustn't I ? '

* * *

We run quite a popular sideline in *Staph aureus* vaccines. Whether these do any good to the patient's soma is questionable but there's no doubt about their boosting effect on the practitioner's psyche. Dr X phoned the lab the other day complaining that she had not yet received the long promised vaccine for little Jimmy's recurrent furunculosis. We told her it had been prepared (from the infant's laudable pus of course) and sent off some time ago Well, she hadn't received it : the vaccine must have been lost in the post ; could she please have some more ? We told her we had already discarded the original culture If she liked to send a second swab from Jimmy's latest effort "Oh, I can't do that she replied brightly ; 'he hasn't had a boil for months

Our heads were bloody but unbowed We shall send her a vaccine prepared from our stock culture (*Staph aureus*, coagulase-negative)

* * *

A woman came to the surgery the other day (I am a casualty officer), bringing her 13-months-old son who had been roughly handled by his elder brother The baby seemed none the worse, but she had rushed him round to the hospital to make sure. I noticed that he wore no nappy and mildly reproached her for this not wanting my couch messed up I'm sorry, Doctor,' she replied I never thought to put one on him He never wears them at home because I always know when he wants to do his business." Yes, I said 'but doesn't he ever wet himself ? " She drew herself up and spoke with a touch of hauteur That does not matter,' she said, "we've got carpets.'

* * *

In *Parson Woodforde's Diary* I came upon "Whirligigousticon for the first time. My husband suggested that it meant Ménière's disease, but from the context it seems to be more or less synonymous with ague From Weston Longeville Norfolk, in 1783, Parson Woodforde wrote : 'Almost all the house ill in the present Disorder and called the Whirligigousticon by the faculty' ; and further on, Nancy brave to-day (tho this Day is the Day for the intermitting Fever to visit her) but the Bark has prevented its return " Their local *doctor prescribes four ounces of the Bark, to be taken* in diminishing doses over a week. This is preceded by the inevitable dose of rhubarb, Parson Woodforde's panacea throughout the diary When he is feeling low and melancholy or is filled with a 'gouty wind in the *stomach,' after vomiting and even when he has had a* day of 'very great purging he takes his rhubarb and is always greatly benefited

Then he often relieves various symptoms in himself and others with a dose of the rum brandy and gin *that he obtained illicitly and in generous quantities* through Moonshine Buck, the local blacksmith. 'Had another Tub of Gin and another of the best Coniac Brandy brought me this Evening ab^t 9 We heard a thump at the front door found 2 Tubs—but nobody *there* " Mr *Buck's annual bill made out discreetly* for Jobbs done, is always large Port is another favourite remedy : 'Nancy contrives still to get better by drinking plentifully of Port wine, at least 1 Pint in a day

Among less orthodox treatments mentioned in the diary is an infusion of the second rind of Alder stick, 'of general benefit but no specific use ; for cramp 'a piece of role Brimstone wrapped up in fine linen to be held by the affected part ; and for Stiony on *the Eyelid rubbing with the tail of a black cat.* The Parson becomes positively scientific in recording his experience with this last remedy

"A little before dinner I made trial of it and very soon after dinner I found my Eyelid much abated of the swelling and almost free from pain. I cannot therefore but conclude it to be of the greatest service to a Stiony on the Eyelid. Any other Cat's Tail may have the above effect in all probability—but I did my Eyelid with my own black Tom Cat's Tail

* * *

The recent announcement that several milligrammes of iron are lost daily by desquamation from the skin has led us to change our routine treatment of hypochromic anæmia In future all these patients will give up washing and lick themselves (or each other) clean—the method adopted by Katt and Dhog (*J ectoderm Nut* 1952, 1 317) The physiotherapy department will arrange for their training in the necessary contortions.

* * *

'Mum's sorry it's all coppers but she keeps her shillings for the gas-meter and please put on the bottle how much to give children so we can all take it."

Letters to the Editor

HERNIATION OF THE NUCLEUS PULPOSUS

SIR —The kernel of Mr Charnley's paper (Jan 19) seems to be a doubt as to whether degenerative changes in the intervertebral disc are the cause of "herniation of the nucleus pulposus," and an attempt "to bring forward evidence that the protrusion of a nucleus pulposus might result from intrinsic causes in the disc" To be sure of what we are discussing it is perhaps wise to re state that the possible causes of protrusion of an intervertebral disc are

1 An increase in tension in the nucleus resulting in rupture of the annulus and arising from (*a*) changes in the nucleus (e g, imbibition of the fluid following some degenerative or other change in the nucleus), or (*b*) increased pressure in the nucleus arising from outside, such as the compression of the whole disc between the adjacent vertebræ

2 A weakened annulus which allows normal nuclear tension to rupture it

3 A combination of both of these factors.

Mr Charnley doubts the existence of degeneration, other workers proclaim it on pathological evidence Mr Charnley describes swelling of any or all the discs, clinical experience restricts it to L5 and L4, with others very rarely involved

In sciatica the onset is typically instantaneous, and one can assume that it is due to a mechanical event Trauma is absent as commonly as it is present—that is to say, trauma in the accepted sense of the word I have no reason to doubt that normally the nucleus pulposus is under tension and that the annulus fibrosus acts as a restraining ring I believe that when the restraining ring gives way protrusion occurs The protrusion causes pain if it presses on, or stretches, or in any other mechanical way irritates, a nerve I know that this irritation can often be stopped as instantaneously by extremely simple measures I cannot accept Cyriax's contention that the protruded disc "slips back again", it is not as mobile as that But the protrusion can be *sucked back*—like the "projection of the nuclei pulposi as seen in the control specimen" of Charnley's experiment, and by very similar means

I assert that if every patient who suffered an attack of sciatica would immediately lie down on the back, flex both hips and knees, grasp the knees with both hands so as to pull the spine into full flexion, and relax, consciously and deliberately, and if he would remain thus for some minutes, few would need operation But the manœuvre has to be carried out quickly, before muscle-spasm develops and becomes fixed The spasm perpetuates the protrusion and accounts for the persistence of pain Likewise in acute lumbago the spasm perpetuates the incipient protrusion, and the manœuvre stops it and its associated pain It sounds like faith healing, but it is not it is based on careful physical and physiological deductions The patients regard it as a miracle The pity of it is that we do not see the patients soon enough

Mr Charnley disbelieves in the "degenerating" disc He argues that because lumbago and sciatica are common before the age of 40 and degeneration is universal only in later years, we ought to suspect this theory of degeneration The degeneration in which I believe is an inflammatory softening of the annulus fibrosus On purely conjectural grounds I see no reason why the disc should be exempt from minor inflammatory attacks, any more than are the skin (boils, carbuncles, pimples, acne), the tendon sheaths (tenosynovitis), the gastric mucosa, the conjunctivæ, and so on Where a patient with sciatica is operated on for disc protrusion one commonly finds adhesions of the theca and/or the root, either with or without a protrusion, inflammation appears to have been present in the past I have even cured a sciatica by releasing a nerve root which was adherent to the back of the 5th lumbar vertebra

There is further presumptive evidence of inflammation in the number of patients—far too many—who volunteer the information that their symptoms started hours or days after they were given a spinal anæsthetic (For this reason I refuse to allow my patients to be given spinal anæsthetics) In the *Proceedings of the Royal Society of Medicine* and in other journals there have been well documented and illustrated cases of discs disappearing by absorption in a surprisingly short time after a diagnostic lumbar puncture One swallow does not make a summer, but I submit that the cumulative evidence is too strong for any of us to dare to deny that inflammatory degeneration takes place The lumbar puncture cases appear to have been infective The others? Well, there are many causes of inflammation, and I believe that inflammation and degeneration is the "obscure process" to which Mr Charnley refers

Let me question the importance or relation between imbibition of fluid and the treatment of our patients. All authorities emphasise the importance of distinguishing between known in-vitro results and presumed in vivo effects No one will doubt that if a portion of a spine obtained from a corpse, lifeless, inert, and incapable of living reactions, is frozen in carbon dioxide, sawn longitudinally into two halves, and then soaked in saline, something is likely to happen Mr Charnley demonstrates that the nucleus pulposus—the centre and core of the disc—swells up As for the intact, unfrozen, untraumatised, and living disc—its nucleus *may* imbibe fluid and swell, but this has yet to be proved It must be proved that the phenomenon happens to a normal, non-degenerating disc, and, if it does, that this swelling of the central portion of the disc (not of the annular region) matters

My conclusions, therefore, are that Mr. Charnley's in-vitro experiments are very interesting, but that, if they have any application in vivo, they explain not the cause but the effect of disc disease I doubt very much that they explain either They appear to apply to the wrong element or portion of the disc

Manchester W SAYLE CREER.

EXPERIMENTAL CANCER OF THE THYROID

SIR,—In your leading article of Jan 12 you accept the concept of a causal relation between excess of thyrotropic hormone and tumour formation in the thyroid of the rat, and ask why cancer is so rarely seen in association with thyrotoxicosis in man

It seems to us that one explanation of this discrepancy may be that the stimulation of the thyroid in thyrotoxicosis is not due to excessive pituitary secretion of thyrotropic hormone Increased amounts of thyrotropic hormone have so far not been found in the blood or urine of uncomplicated cases of thyrotoxicosis High levels of thyrotropic hormone have been found only in cases complicated by ophthalmopathy D'Angelo,[1] De Robertis,[2] and Purves and Griesbach,[3] using different methods, have all failed to find elevated levels of thyrotropic hormone in the blood of cases of uncomplicated thyrotoxicosis Furthermore, pituitary cytology studies give no indication of involvement of the pituitary in this disease Wegelin,[4] describing the pituitary cytology of 20 cases of Graves's disease, came to the conclusion that the cell picture of such pituitaries was concordant with that of a continuous overdose of thyroxine. The basophilia characteristic of oversecretion of thyrotropic hormone was absent

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1 D'Angelo D A Paschkis K E Gordon A S, Cantarow, A *J clin Endocrinol* 1951 11, 1237
2 De Robertis E *Ibid* 1948 8 956
3 Purves H D Griesbach W E *Brit J exp Path* 1949, 30 23
4 Wegelin C *Ann Anat path med-chir* 1938, 15, 703

We are therefore of the opinion that the high blood levels of thyrotropic hormone necessary in the rat for the development of thyroid neoplasms are not present in thyrotoxicosis in man

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F BIELSCHOWSKY
W E GRIESBACH
H D PURVES

ANÆMIA IN AFRICANS IN UGANDA

SIR,—I am glad to see in your issue of Jan 12 that Dr Hutton has from Uganda countered some of the statements made by Dr Trowell in his article of Oct. 27 I should like to support Dr Hutton in his reassurance that there is no reason to assume that in Africa there exists a new and mysterious anæmia different from those seen in other parts of the world.

Macrocytic anæmia in Uganda does not respond to substances active in pernicious anæmia because it has no relation to this group of diseases In Kenya, probably because of the lower incidence of anæmia due to tropical parasites, Foy and his collaborators[1] discovered cases of megaloblastic anæmia which responded to orthodox treatment in the expected manner Dr Trowell himself describes in his article a case of pernicious anæmia in Uganda, found after many years of search, which responded to liver treatment.

As regards other macrocytic anæmias in Kampala, I can only emphasise once again that I have never seen a case of macrocytosis in an African in which there was not also reticulocytosis This precoctic blood picture is due to increased strain on the bone-marrow from blood loss caused by infestations or infections. Why should it seem mysterious to Dr Trowell that these cases are cured when a liberal diet is given rich in protein and infections are treated ' ? The treatment of tuberculosis involves a liberal diet, but no-one would suggest that the patient's debility is not due to tuberculous infection

In Africa iron deficiency is only one of the signs of hookworm anæmia In this disturbance there are multiple small intestinal injuries from which blood slowly oozes, and the intestinal mucosa has ample time to digest and reabsorb this. Organic iron or hæmoglobin is reabsorbed only with difficulty Thus the ' bottle neck in this particular infestation is iron deficiency which will cause microcytic hypochromic anæmia. With treatment by iron, however, simple hæmorrhagic anæmia without iron deficiency becomes established It will depend on the severity of bleeding whether there will be considerable or only slight reticulocytosis with macrocytosis. The same happens in Europe where an iron deficiency anæmia due to chronic hæmorrhage will, with iron treatment give a precoctic blood picture unless the hæmorrhage is also treated If hookworm anæmia is treated with iron, or if iron is liberated intravascularly in malarial and other pathological hæmolyses, macrocytosis will develop The second mechanism explains why in Africa hookworm anæmia is not necessarily microcytic even when iron has not been administered. If such cases are kept under observation it will be found that iron deficiency will develop when the hæmoglobin level rises.

Much confusion could be avoided if the term pre coctic blood picture were adopted. I proposed this term as describing a condition where large cells are produced in regeneration (reticulocytes and early post-reticulocytes) the macrocytosis not being due to a disturbance of bone marrow function by the absence of essential nutrients, but being on the contrary caused by an activity of the marrow which leads to emission of slightly unfinished cells (*coctus* = fully mellowed) To call these cells immature would suggest an inhibition at the nucleated stage and the term regenerative would not differentiate this state from a state where regeneration proceeds without macrocytosis. The term macronormoblastic anæmia " is not fully descriptive because, although as a rule the precoctic blood picture is seen with a macronormoblastic marrow they are not always found together I have little hope that the term precoctic ' will be generally adopted It seems that there is some truth in the saying of a distinguished physiologist that a scientist is a man who would rather use his colleague s toothbrush than his terminology "

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H LEHMANN

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[1] Foy H., Kondi A. Hargreaves A. Lowry J *Trans R. Soc. trop Med. Hyg* 1950 43 635.

ENDOCARDIAL FIBROSIS

SIR —Following your annotation of Jan 12 on this subject, we would like to draw attention to a similar condition in infancy and childhood

At this hospital during the last few months necropsy has revealed fibro-elastic thickening of the endocardium in five cases under the age of 6 years In addition we have under observation six other cases in which the condition is suspected on clinical grounds.

Apart from endocardial thickening there are many features in common with the condition in adults Myocardial changes are often found,[1-4] and the infant commonly dies very rapidly in cardiac failure In view of the observation by Bedford and Konstam[5] of aortic hypoplasia in some cases, it is of interest that aortic anomalies such as coarctation have been reported in childhood cases[4 6-8] In two of our cases examined post mortem severe aortic valvular stenosis was present.

On the other hand there are a number of important differences between the childhood and adult types of endocardial thickening Eosinophilia has not been a feature in our cases. In only one did we find endo ventricular clots and evidence of systemic emboli. In particular valvular lesions are frequently found[8 9 10] and fœtal endocarditis diagnosed[1 4] There is now considerable doubt whether such valvular lesions are in fact the end result of inflammation of infective origin This doubt is upheld by Gross,[10] who states that fibro elastic thickening of the endocardium is present in 70% of cases of so called fœtal endocarditis All of our five cases of endocardial thickening that have come to necropsy have shown valvular lesions, severe enough in three to cause obstruction The valves on the left side of the heart were predominantly affected in our series, as in others[3]

Eosinophilia does not seem to be a feature of the childhood disease nor has nutritional deficiency been prominent. The extent of the endocardial thickening found in some cases dying shortly after birth[1] suggests that some abnormal developmental factor may have been at work In one case where the infant died at the age of $3^1/_2$ months heart block was diagnosed antenatally at the 7th month of intra uterine life; post mortem, extensive endocardial thickening was noted and the heart block was attributed to this[11]

Some cases present in infancy and childhood as idiopathic hypertrophy or heart-failure of obscure origin without definite clinical evidence of valvular lesions.[5 12 13] We have therefore come to suspect the condition clinically in three main types of case (1) cardiac enlargement in which severe valvular lesions glycogen-storage disease, and familial cardiomegaly can be excluded, (2) heart failure of obscure origin, and (3) valvular lesions other than pulmonary at an age when rheumatic heart-disease is unlikely to have developed

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[1] MacGregor R. E McKendry R. *Canad. med Ass J* 1944 50 433.
[2] Mahon, G S *Amer. Heart J* 1936, 12 608
[3] Craig J M *Bull Int. Ass med. Mus.* 1949 30, 15.
[4] Farber S., Hubbard J *Amer J med Sci* 1933 186 705
[5] Bedford D E., Konstam, G L. S. *Brit. Heart J* 1946 8 236
[6] Edmonds H W, Seirs W B *Pediatrics* 1951 7, 651
[7] Weinberg T Himmelfarb A J *Bull Johns Hopk Hosp* 1943 72 299
[8] Levine H. D *Amer J Dis Child* 1934 48, 1072
[9] Emery, J L Illingworth R. S *Arch. Dis Childh* 1951 26 304
[10] Gross, P *Arch Path* 1941 31 163
[11] Standler H E. Reid C A. Freidmann H P *J Pediat.* 1950 36 370
[12] Crawford B L. Weiss E. *J tech. Meth.* 1929 12 152.
[13] Vulliamy D G *Brit Heart J* 1947 9 101

Whether there is any relation between the condition in childhood and the adult form is a matter for conjecture Macroscopically the appearances are similar Microscopically the presence of a considerable amount of elastic tissue in addition to fibrosis in the endocardium would seem to render "endocardial fibro-elastosis" a more suitable term than "endocardial fibrosis" for the condition in childhood It is not clear whether special stains for elastic tissue have been employed in all the adult cases Unfortunately, one feature shared by both forms is a poor prognosis

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HAYGARTH HOUSE, HARLOW

Sir,—One cannot fail to be impressed by Dr Stephen Taylor's account last week of the conversion of two semi-detached houses into a small health centre on this new estate The details of arrangement, furnishing, and decoration are quite fascinating

But it cannot be held that this "health centre" is any more than a well-built lock-up surgery capable of use by three doctors and a dentist, with room for small public health clinics of an unambitious nature Whatever the legal definition of "health centre" may be, these premises contain none of the features which excite the public imagination when health centres are discussed There is no room for minor operations, no X ray apparatus (except dental), no miniature pathology laboratory, no library, no physiotherapy, and finally no nursing, clerical, or secretarial assistance unless the doctor can afford to pay for it himself From the doctor's point of view it is a lock-up surgery shared with some others

One of its chief, but to my mind dubious, assets is that the doctor or doctors using the place can live at some unspecified distance away in peace and seclusion As the premises are so small and the population it serves not sufficiently numerous, there can be no question of a doctor being there on duty all the time, nor even a nurse What then of the everyday emergencies which occur out of surgery hours in every general practice? I refer to dog-bites, suspected fractures, cuts needing stitches, other lacerations, burns, foreign bodies, abscesses, requests for advice in cases not needing visits, and urgent administrative matters Is each to be made the occasion for the doctor to be called from his home, get out his car, and drive to the surgery? Or does the patient go to the doctor's home and receive attention in the hall or living-room?

Of course, this problem is bound to arise wherever lock-up surgeries are used, but it hardly seems to be the ideal basis for a project which is to satisfy both doctor and patient under the name of "health centre" It raises an issue which is of great importance to all general medical practitioners It assumes more importance as the health service develops and doctors are drawn into a medical system where administration and centralisation must replace the hitherto unorganised efforts of individuals giving general medical services Can a doctor live outside the area of his practice and work purely from a lock up type of premises such as Dr Taylor describes? Is it good for the patients? Is it good for the doctor? Is this to be the pattern for the future?

I must confess a weakness for the old days when the doctor's house on the corner had a good red lamp in the front garden and there the doctor lived, worked, and died and was reasonably available to his patients both in and out of surgery hours according to the nature of the case It may have been a life of slavery in the days before the National Health Service, but the limitation of a single doctor's list to 4000 has stopped that The doctor's house was no centre of research or medical achievement, but it provided the sort of service which people need from their family doctor and raised his status over the years from a rather low corner to a respected and valuable place in the life of the community

I do not think that you can go into general practice determined to work it like a public health clinic The roots of medicine are too old and too deep to allow this. I think that the profession and practice of the family doctor is still a vocation for most who enter its ranks, and that it is inseparable from the tradition of unusual service to the community which cannot be given without some sacrifice In my opinion this sacrifice is often exaggerated by both doctors and the well intentioned public There are many jobs which call for more sacrifice than the average family doctor makes

While wholeheartedly in favour of mutual help and coöperation between practitioners in arranging work and adequate off-duty, in obtaining better working conditions, and in pooling resources generally, I am very dubious of the tendency to run traditional medical practice from lock-up premises I think preference should be given to a doctor who is prepared to live at his surgery on a new estate rather than to the doctor who is prepared to attend a health clinic there

Finally I should like to say that I do admire the way in which the Harlow premises have been adapted, furnished, and apportioned It is obviously the outcome of much thought and observation of the mistakes and successes of others But I think that it should be called a group surgery and clinic—not a "health centre" Also, I beg that more thought should be given to the possible effects of separating the family doctor from his surgery premises and place of work Is this new-type lock up surgery to be the pattern for the future general practitioner to adopt?

Sheffield

E C Atkinson

INDUSTRIAL HEALTH SERVICES

Sir,—The references to the problems of industrial medicine in your leading article of Jan 19 misplace the emphasis

Industrial medicine is not a single subject. The problems of industrial toxicology are restricted to a minority of industrial processes, by far the greater problem is the general one of trauma and associated sepsis The sickness rate among workmen may not be directly due to the conditions inside the factory In addition there is the problem of psychological disturbance, this affects management-labour relations and the approach of the workman to his job, and has a bearing on conditions in the home

The proper foundation for the general medical surveillance of factories is preventive medicine The organisation already exists, and the routine inspection should be done by the local medical officer of health and his staff The present medical inspectors of factories should be promoted to regional consultants in industrial toxicology Where there is a special industrial hazard the regional consultant would work in coöperation with the medical officer of health, as the medical staff of the Public Health Laboratory Service already do

The factory is only one aspect of the total environment and should not be considered as a place apart There are too many small factories for adequate inspection by any central body In this town alone there are over 900 factories, of which less than 50 employ more than twenty persons and less than 20 employ more than fifty All these could conveniently have an annual inspection by the local health staff It is doubtful whether Whitehall could provide the same cover, and it is certain that they cannot have the same local knowledge Where improvements or alterations are necessary the health department can supervise the whole matter and can lay the proper emphasis on relative needs throughout the town

Already the local authority cares for the potential worker up to the time he leaves school Housing and health visiting of all members of the family are both local-authority commitments, as is the care of the aged workman after retirement The only part of his life for which the local authority does not provide full care is at his place of work and even there the Factory Acts require certain attention by the local sanitary authority In factories *with power* the sanitary authority is already responsible for overcrowding condition of floors and staircases, cleanliness, and sanitation In factories *without power* there is the extra responsibility for heating lighting and ventilation In addition the local authority is responsible for the full environmental and welfare condition of offices. All canteens are under the constant survey of the health department

There is no need to provide from our limited man power a separate industrial service the basis exists in the public health department.

W S PARKER
Brighton. Medical Officer of Health

THE WORLD'S FOOD

SIR,—One remark by Mr N W Pirie, F.R.S, in your issue of Jan 5 has been suitably dealt with by Dr Preece (Jan. 26) Part of Mr Pirie s letter was to the effect that "advances in technology and the opening up of new lands have so far proved the fears groundless' that an expanding population could not be fed That these fears have hitherto been groundless is true but there is no reason for complacency about food-supplies. There are no more new lands; and optimism about technology seems misplaced unless it can be shown that the world has enough materials for technology to operate It looks, however as if the world s population is becoming increasingly busy in sawing off the branch on which it sits

'Technology' presumably includes such things as the provision and use of fertilisers and the evolution of new crop varieties (e g that very successful novelty high yielding hybrid maize) Since high yielding crops depend greatly on fertilisers (as does the success of projects for reclaiming or irrigating land now uncropped) the main question centres on supply of energy for certain fertilisers, of which phosphates are the chief Some new lands and some old ones (e g the Don basin) require little or no fertiliser for cropping at a low but sustained level; but their total product is necessarily limited

Fertilisers other than sodium and potassium salts mined from the earth require much effort to make their nutrient elements available to plants. Mined nitrogenous fertilisers are wasting assets to make synthetic nitrogenous fertilisers coal or other source of power is needed. However nitrogenous fertilisers of all kinds characteristically produce carbohydrate and oil in plants; special means which are expensive in labour and fuel have to be adopted to gain significant proportions of protein by applying combined nitrogen to crops and protein is (and so far as we know always will be) generated most easily by adaptation of nitrogen fixing bacteria associated with leguminous plants Cultivation of leguminous plants is also the surest way of raising and maintaining the nitrogen equilibrium of the soil

Leguminous plants—the source of most of the world s vegetable and animal protein—require phosphate lime and sometimes potassium There is no shortage of any of these fossil nutrients but whereas limestone and potassium salts demand little preparation before they can be taken up by plants, raw phosphate has to be processed in order to make its phosphate available, There are many acceptable processes but the method of choice has been just to mix the ground phosphate rock with sulphuric acid obtained by burning native sulphur or sulphur of pyrites such simple admixture is enough to convert the phosphate into a form which plants can use Any alternative involves high consumption of carbonaceous fuel or electric power

What historians call *the* agricultural revolution was a successful essay in gathering more protein than ever before accompanied by cereal carbohydrate and animal fat. This revolution centred on the use of arable clovers, before fertilisers were generally introduced towards the end of the last century Cereals have come in quantity from new lands only this century During the last forty or fifty years also, a second and almost unnoticed revolution in protein gathering has occurred through the introduction of wild' white clover into grassland of humid climates (Great Britain New Zealand eastern North America) and of comparable legumes such as subterranean clover soybeans, and lucerne or alfalfa into slightly warmer or the same, "new' regions The possibilities for gathering protein and raising the level of soil productivity have now been rounded off though of course, yields per acre can still be increased in humid regions with good management and adequate fertiliser The problem therefore, is not whether enough food for another one or two thousand million can be provided: it is to maintain fertiliser supplies—and especially plant-available phosphate—so as to feed the present population Thought must be given to the ugly question of how food supplies are to be kept up to their present level.

The need is to provide enough energy for making fertilisers to sustain the present artificial level of intensive husbandry For phosphate there is the choice of carbonaceous and sulphureous fuels or hydro electric or other power If energy from nuclear fission or the tides is ruled out and in view of the restricted possibilities of getting hydro-electric power the choice is narrowed to two wasting sources of fuel accumulated during millions of years, largely dissipated within fifty years, and not likely to last much longer at present rates of consumption

This is not merely something for posterity to worry about On all but a few fortunate soils (e g, those of Java, possibly) a recession of yield will begin *one* year after phosphate is withdrawn or curtailed and will be appreciable within five years.

Excepting what has been gained from new semi arid lands, such as the American prairies, the main increments in food-supply have been derived from use of fertilisers and leguminous plants during quite recent times. These gains are attributable to management based on phosphate, which has yielded principally animal products such as meat, bacon milk cheese butter and other animal fats and also Australian wheat

Vegetarians who would have the United Kingdom produce more vegetables seem to forget that vegetables cannot be satisfactorily eaten without fat they also seem to be unaware of climatic and agronomic limitations Vegetarian and semivegetarian peoples all have indigenous sources of oil and protein (usually pulse); except for animal products, Britain has neither nor has it any chance of producing a large quantity In what we mostly like to eat and what we can produce we in Britain are nearer to the Eskimo than to the Hindu

Nevertheless even our present volume of food from these islands depends primarily upon phosphate which is to say sulphur; and except at the price of finding and using more fuel or other source of energy, neither Britain nor the rest of the civilised world has a prospect of maintaining its present output of customary foods. We are all in short, threatened with an agricultural power-cut.

West of Scotland Agricultural College
Glasgow HUGH NICOL.

PROCTALGIA FUGAX OR ANORECTAL SPASM

SIR,—The condition described under the term "proctalgia fugax" by your correspondent (Jan 5) is more commonly known, when it is known at all, as "anorectal spasm" The British Society of Gastro-Enterology discussed it a few years ago but arrived at no definite conclusions The subjects are usually intellectual or highly nervous types, and the medical profession seems particularly liable Probably it is not very uncommon, but it is rarely mentioned in textbooks or even in special monographs Of patients who have told me of attacks, only one or two have directly consulted me for them, others have mentioned them almost casually This lack of publicity may be due to the nature of the attacks While the pain is evidently very severe it does not last long, and the duration of fifteen minutes given by your correspondent agrees with what I have been told No local cause can be found and no organic disability ever results, and the attacks usually become infrequent or cease completely about late middle life

Subjects often learn some trick which brings an attack to an end, as your correspondent tells us he has, but there is *no common ground as to the method adopted* Many years ago a sufferer told me that he could abort the pain almost instantaneously by a small cold-water enema which he allowed to return directly the pain ceased, and he never travelled without a syringe He had heard of this method from another sufferer When it has been necessary to suggest a treatment I have passed on this advice

London, W 1 HENRY TIDY

COLLEGES AND FACULTIES

SIR,—When the Royal Colleges of Surgeons and Physicians were founded, their fellows and members were all general practitioners No other body was necessary The evolution of medical science has made specialisation inevitable, with the rather surprising result that a man may qualify and practise medicine as a general practitioner, and yet have no contact with these two colleges except for a week or two during the process of being licensed to practise

There is another side to the question Dr Todd's article (Jan 19) on the treatment of peptic ulcer is a fascinating example of how one particular form of illness can be claimed in turn as the prerogative of different specialties—surgery, medicine, and psychiatry Dr Todd rather wisely emphasises that each of these *may* be able to help in particular cases, but it is for the general practitioner with his intimate knowledge of the patient's make-up to decide which is the most favourable possibility In other words, there is a unity in medicine, and the patient should be treated by a team which works closely together—the family doctor and the various specialists—with no wide division between them

I strongly support Sir Ernest Rock Carling's plea (Jan 26) that the three Royal Colleges should unite into an Academy of Medicine, and that they should accept a section of general practice on an equal footing in the direction both of medical teaching and the examination of candidates, and of the subsequent care of their academic lives

Great Dunmow, Essex. G O BARBER

SIR,—I feel that the main function of the proposed "College" of General Practice must be initially the elevation of the status and standards of the general practitioner from his present level to that of the best of his specialist colleagues, a level commensurate with his wide responsibilities An instance of these responsibilities is the care of the chronic and aged sick

Lowe and McKeown[1] concluded that a fifth of the patients occupying beds in a Birmingham institution for the care of the chronic and aged sick were ill enough to warrant admission to and treatment in a general hospital The criteria used were that the patients required skilled nursing and/or medical attention once a week or more often In my practice during the month of December, 1951, there were on an average six patients over 60 years of age who fulfilled these criteria. If my patients were a fair sample of the population of Birmingham, then there were six times as many patients in this grou treated at home by their general practitioners as were treate in the infirmaries

Accepting the necessity for achieving this elevation status we must then consider how it shall be done. feel that the basis of any such approach must be, firstl a clarification of the vast sphere of work which is t natural province of the general practitioner (perhap on the lines indicated in my example) and, secondl from these findings to alter the bias in medical educatio and the allocation of medical resources

We must then consider the constitution and name this proposed "college" Three main proposals hav been made, namely the formation of

1 A College of General Practice immediately This wou seem to be ideal from the general practitioners' point of vie

2 A Faculty of General Practice in a new body, t Academy of Medicine, as proposed again recently by S Ernest Rock Carling It is unlikely, however, that the Roy Colleges, with their long traditions, will agree to this reco stitution merely to accommodate the general practitioners.

3 A single Faculty of General Practice sponsored by t present three Royal Colleges

Finally, may I suggest an Academy of General Practi not allied formally to any other body? This academ would feel its way and develop freely Eventually wh its first and main function had been fulfilled it could tu to broader fields This I think might meet with mo ready and general acceptance

Harborne, Birmingham D L CROMBIE.

ECONOMY IN X-RAY FILM

SIR,—Dr Martin (Jan 26) appears to have made mistake in the use of his words Sniping, I understan is firing by an unknown person from a concealed positio It is obvious from his letter and the subsequent corr spondence that I, on the contrary, am fully exposed but apparently my firing was accurate

All my efforts have been devoted to creating an helping clinicians rather than abolishing them—they a doing the latter for themselves, as Dr Martin's suggestio appear to confirm I defy him to find support for an of his suggestions or criticisms in any one of my publishe works I should be sorry to learn that a radiologist d not always encourage friendly discussion and collabora tion He does realise that he is but a helper—the muc weaker partner—but his criticism, based on knowledg and experience, of the work of those who have not th basis, and who would usurp or even abolish his office diminish its value, should be regarded as defence aggression

I thank Mr Downie (Feb 2) for his statement "W have become so used to these devices that some clinicians think they have made a diagnosis when they hav referred a patient to the correct special department" for that is my complaint Sir James Paget described hi observations on one case of osteitis deformans withou aid from any of the ancillary services except pathology but though many tens of thousands of cases have sinc been described with the aid of all the multitudinou tests, including radiology, little has been added, and this is but one example In those days clinicians did no boast that "the clinician can recognise, with a fai degree of accuracy, such diverse maladies as herni measles, dandruff, and prolapsing piles All othe 'diagnosis' is mere suspicion or surmise"

Mr Downie asks of me "Can he not recall a singl healthy young house physician with tuberculosis

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[1] Lowe C R, McKeown T *Brit J Soc Med* 1949, 3, 112

My emphatic reply is no but I can recall patients with old tuberculous lesions who had no symptoms whose radiographs excited major surgical procedures. Has he not read my papers on bone tumours? There I strongly advocate serial radiographic surveys to aid clinical vision without disturbing the sequence of changes by surgical trauma or infection but alas, another group as strongly opposes that.

Can Dr Cochrane Shanks (Feb 2) tell us who advised the Government to purchase foreign films which had little keeping quality and produced such bad radiographs that some of us after trial refused to waste further time using them? What did happen to those films? Were they not offered free to hospitals, which would not take them? Were we exporting good British films at that time?

I repeat that the efficient and economical servicing of X ray units during and for some years after the 1914 18 war by the Office of Works was not characterised by such shameful destruction of efficient units as has followed the issue to hospitals of multiple forms with some such inviting words as "The following units are available " followed by details of highly expensive elaborate equipment by all of four or five manufacturers with invitations to indent for the coming year Dr Cochrane Shanks is wrong to say it was always the radiologist who advised the purchase he was not always permitted to prevent it Equipment has been installed contrary to my wishes. I still serve hospitals with equipment 15–20 years old, and can produce radiographs which I am prepared to match against any taken with the aid of 'modern' equipment. But such economy does not permit of show it is frowned upon by the responsible authorities Perhaps with the economy which is being forced upon us even Dr Cochrane Shanks will not be so ready to attack those colleagues who have always been accustomed to practise it.

Birmingham. JAMES F BRAILSFORD

FRUIT NEEDED IN SPRUE

SIR,—In the treatment of sprue the banana is the great stand by, but the crops on which we depend have been devastated last year in Jamaica and now in the Cameroons. Next to it should be rated the tinned tomato-juice from Australia which is never harmed by gales as the top heavy banana is it is to be hoped that this is not one of the tinned fruits whose import is to be prohibited

A PATIENT

WEIL'S DISEASE TREATED WITH PENICILLIN

SIR,—In your issue of Dec. 15 Dr Herbert-Burns and Mr Flavell report favourably on the action of penicillin in a case of Weil's disease Agglutination tests remained persistently negative during the illness and after recovery but on clinical evidence the writers suggest that there is no reason to doubt the diagnosis It is true that an instance has been recorded [1] in which a strain of *Leptospira icterohæmorrhagiæ* was isolated from a patient who failed to develop antibodies, but experience shows that such a complete absence of agglutinins is very rare.

It may be questioned therefore whether there is good justification for quoting a single case, not fully confirmed, as evidence for the value of penicillin in view of the fact that an analysis of 152 cases of Weil's disease with jaundice treated by penicillin revealed a case mortality of 22% [2] compared with 23% in pre-penicillin days

Records are too few for an assessment of the therapeutic activity of the newer antibiotics in human leptospirosis but in animals 'Aureomycin' and terramycin [3] appear much more efficacious It would be unfortunate, therefore if undue complacency regarding the value of penicillin should deprive patients of what may turn out to be more effective remedies

J C BROOM

Wellcome Laboratories of Tropical Medicine
London N W 1

ACUTE INFECTIONS OF THE FINGERS AND HAND

SIR,—In his rational and interesting article of Jan 26 Mr Bailey advocates a direct approach to the pulp abscess

During the late war when lights failed in the blackout, it was occasionally necessary to examine septic fingers by the light of a pocket torch. Transillumination of the infected pulp from the palmar aspect often showed precisely the situation of a small abscess The reliability of this test has been proved subsequently; but for satisfactory results a dark room and a bright beam of light are advisable

Cambridge M HARTY

⁂ The use of transillumination for this purpose was illustrated by Dr E P Samuel in an article in our issue of April 22, 1950—ED L

EVOLUTION OF THE TOXIC THYROID GLAND

SIR,—Mr Levitt (Nov 24) having arranged his cases of toxic goitre and thyroiditis in an impressively orderly series, maintains that this demonstrates a progression in time of each individual case through the series. I (Dec. 8) admitted the series but denied that this proved the temporal progression, claiming incidentally to know at least four alternative explanations Mr Levitt (Jan 26) asks me to produce them Here are five, for good *measure*

1 (Nearest to Mr Levitt's hypothesis.) The whole series may be the result of the action of a single abnormal stimulus on thyroids of varying reactivity The normal response is hyperplasia and clinical hyperthyroidism but in some older women the same stimulus simply tips the thyroid over at once into a degenerative phase

2 (The most generally accepted hypothesis) Toxic goitre and Hashimoto's disease are two wholly distinct diseases which happen to overlap in some of their clinical and pathological manifestations.

3 The same two diseases are distinct but one predisposes to the other so that the two will be found together more often than can be expected by chance (in the same way that silicosis and tuberculosis blend in the lung not by chance but are yet not the same disease)

4 The series represents the intermingling of three or four or any number of unrecognised entities: until we have some knowledge of the ætiology of the condition we have none but William of Occam's authority for assuming that only one or two diseases are involved Biology gives plenty of examples of distinct pure lines mixing together to produce an apparently homogeneous population with continuous variation. The thyroid is limited in its mode of reaction to injury but paucity of reactions is no guarantee that the number of types of injury is equally few We have it on the authority of the bacteriologists that the number of pneumonias is legion without them morbid anatomists and clinicians would be equally hard put to it to say how many there were, and a school of monophysites would undoubtedly arise to prove the essential unity of the whole group

5 Lymphoid tissue in the human thyroid is a reaction to infection by a universally present thyroxinophilic virus (more abundant in the active gland) which is normally non virulent but just occasionally destroys the gland. This is a somewhat fantastic hypothesis; but there is some evidence *that such a condition can be produced in the pancreas of fowls* by the virus of infectious lymphomatosis.

I have no intention of defending any of these hypotheses in detail. I am concerned only to show that temporal progression is not the only possible explanation of the thyroid series.

The construction of such series, though often exceedingly profitable is full of pitfalls Even a perfectly legitimate series, such as that between tuberculosis and silicosis already cited, may simply demonstrate an association which is in no sense an identity Illegitimate series may be exemplified by that which connects asthma through polyarteritis to hypertension The chain is cast-iron but irrelevant polyarteritis is a sort of undistributed middle term, and asthma and hypertension remain as distinct as ever they were before polyarteritis was thought of I suspect some such plausible but *illegitimate link somewhere* in Mr Levitt's chain

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[1] Garnier M., Reilly J *C.R. Soc Biol Paris* 1917 80 101
[2] Broom J C. *Brit med J* 1951 ii 689
[3] Uhlenhuth, P Schoenherr K E *Z ImmunForsch* 1951 108 289

One small point on which my first letter was too elliptical I mentioned twenty-odd cases of thyroiditis in none of which the basal metabolic rate (B M.R) had ever been raised I meant that none had ever, in any previous hospital admission, had a raised B M R, or any other objective evidence of thyroid hyperactivity Surely it is not too much to assume that if all twenty had passed through a toxic phase, one at least would have been admitted to hospital during that phase and been diagnosed as such ? I will sooner believe that the assiduous clinician can find retrospective evidence of thyrotoxic symptoms in a substantial proportion of all elderly women, than that the proportion of cases of so disabling a disease as genuine thyrotoxicosis admitted to hospital is less than one in twenty

Postgraduate Medical School of
London, Ducane Road, W 12
BERNARD LENNOX

LONGER LIFE

SIR,—Dr Boardman (Jan 26) raises a logical and at the same time familiar theoretical objection to the argument for the preventive value of weight reduction in the overweight

The point at issue is whether, before a policy is adopted, theoretical argument must be carried a stage further Even if the difficulties entailed in testing Dr Boardman's supposition with further control groups were overcome successfully, the argument could still be criticised on the grounds that a third unknown but common factor might be present

There comes a point when evidence is so suggestive that action is desirable Has this point been reached ? My letter (Jan 12) drew attention to new and important evidence concerning those illnesses which cause the majority of male deaths from the age of 45 onwards Should I now go further and add that acting on this evidence a national weight-control campaign has recently been launched in the United States under the auspices of the Metropolitan Life Assurance Company, the American Medical Association, and the Public Health Service ?

Institute of Social Medicine,
Oxford
R W PARNELL

POISONING FROM PLANTS

SIR,—The cases of poisoning in children mentioned by one of your peripatetic correspondents (Jan 19) recalls to mind a similar occurrence some fifteen years ago, when I was more successful in identifying the plant concerned From the symptoms briefly described by your correspondent it seems probable that the same one is involved in both cases—namely, hemlock, water dropwort (*œnanthe crocata*), a virulently poisonous plant which grows abundantly in the marshes, ditches, and wet spots in this locality It belongs to the parsnip family, its roots consisting of a bunch of large tubers The symptoms when it is eaten are similar to those of strychnine poisoning, the active principle being, I believe, picrotoxin It is one of the most dangerous and virulently poisonous plants in the British flora, and children who live near marshes where this plant grows should have their attention drawn to the dangers of eating it

County Hall,
Cardiff
W E THOMAS

*** Poisonous flora in Britain was discussed in our issue of Sept 27, 1947 (p 485) —ED L

ACCIDENTAL SPINAL INJECTION OF XYLOCAINE

SIR,—Dr Howat's report (Jan 12) of accidental total spinal anæsthesia during attempted epidural analgesia, stimulates me to mention two points which have emerged from a recent series of cases in which the epidural technique was used

1 Most of the anæsthetic solutions commonly used conduction anæsthesia *outside the theca* are hypobaric, few of the stronger solutions are isobaric I have measu the specific gravity of all the solutions I am in the habit using, and find none which are hyperbaric

Whilst one cannot control the volume of a solution o it is injected into the theca, one can usually control the spr by gravity, should this volume be small Since it is comm practice to inject epidurally in the lumbar region and tilt table head down to facilitate spread upwards, it is so what reassuring to know that this same position will ca intrathecal solutions to spread caudally

I would suggest that the manufacturers give more public to the specific gravity of solutions used for conduct anæsthesia, in view of the increasing popularity of epid anæsthesia

2 From Dr Howat's report it would appear that spinal needle was originally in the epidural space (since cerebrospinal fluid appeared at the hub), but that it "pushed on" during injection. This is difficult to prev with any certainty However, the use of an adjusta "stop" on the needle is highly advisable, when this is available it is best not to use a spinal director, which larg abolishes the grip afforded by the interspinous ligaments skin.

After the injection of solution, in any volume, into epidural space, some often drips out of the needle T may give rise to anxiety lest the theca be punctu The drops of fluid, however, only appear for a very sh time, and suction by a syringe produces no more fluid

R.A F Hospital,
Rinteln, B A O R.
H BARRIE FAIRLEY

THE KIDNEY OF SCLERODERMA

SIR,—I was very interested in the article by Dr Mo and Professor Sheehan (Jan 12) In a case that I h encountered recently another lesion, additional to th they described, was present

In 1933 a woman, aged 45, with advanced scleroderma admitted to Guy's Hospital in coma and died within half hour, so that no history was available At necropsy there was little of note in the kidneys, which together weighed 250 g Histologically there is very little disorganisation of the kidney in the section available, although the vascular lesions are quite widespread In addition the glomeruli show some thickening of the basement membrane which has, in places, given rise to actual hyaline subendothelial masses (see accompanying figure) These are probably the lesions that Bevans[1] refers to as "wire loop although they appear to me closely to resemble the chan of type II nephritis of Ellis[2]

The number of different changes that may be seen the kidney in any condition is rather limited, and th cannot be put together into many more combinatio

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[1] Bevans, M *Amer J Path* 1946, 21, 25
[2] Ellis, A. *Lancet*, 1942, i, 1

Although the combination described by Dr Moore and Professor Sheehan is highly characteristic of this condition it is apparently not invariable and judging by the above case, it does not always occur in pure form. Incidentally, this finding is evidence of the lack of specificity of the changes of type II nephritis, on which point I propose to present further evidence in the near future.

Department of Pathology
Guy's Hospital Medical School,
London, S.E.1

J B ENTICKNAP

ABERRANT RENAL ARTERIES AND HYPERTENSION

SIR,—I was particularly interested in Dr A G Marshall's remark in his article of Oct 20 that he had been unable to find any previous account of the association between hypertension and aberrant renal arteries.

As a student at Witwatersrand University Medical School I dissected the renal vessels in the cadavers of [illegible] Bantu children, the ages ranging from 6 months fœtus to 18 months postnatal. I found aberrant or accessory renal vessels in only 15%. This figure is very much lower than those reported from Europe—which may account for the low incidence of hydronephrosis in the Bantu and (if Goldblatt's theory of renal ischæmia in hypertension is accepted) for the comparatively high incidence of hypertension

Johannesburg South Africa

A D BENSUSAN

BREAST-FEEDING AND DIET

SIR,—The well known research worker on human milk, Dr I G Macy has stated that ' when the necessary ingredients for the synthesis of milk are lacking in the daily food, the mother's output of milk may be decreased or the milk may become deficient in those constituents, or the needed elements may be withdrawn from her body tissues. '[1]

The diet recommended for nursing mothers is known too well to need description[2] The question naturally arises as to the lactation capacity of the vast majority of the world's mothers who simply do not consume such a diet. Is their milk insufficient, or of poor quality? Is the withdrawal of the needed elements—for example, of calcium—attended by deleterious effects? It is interesting to note that under very adverse conditions of diet and environment, breast feeding may be maintained with a varying degree of success. This was observed at Belsen concentration camp[3] at Leningrad during the siege,[4] in starving Holland in 1945[5] in the prisoner-of war camp at Singapore,[6] and at similar places. But the drawback is that data on the yield and composition of milk produced under such conditions are not available.

Information on the breast-milk of South African Bantu mothers is thus of interest firstly because the great majority of these mothers are wholly able to breast feed their infants for 6 months or longer and secondly, because the high-cereal diet, although seldom deficient in calories, is inadequate in various respects according to accepted standards; certainly the mothers do not get the recommended allowances of milk, butter eggs meat, and fruit. Breast-milks were obtained from 200 urban Bantu mothers differing in state of health age parity and month of lactation For total solids, protein fat, lactose, ash, calcium, and phosphorus the ranges have been found to be as wide as those reported elsewhere but our averages are almost identical to those given for white mothers by Dr Macy[7] The vitamin-C contents are somewhat lower but the rarity of scurvy among urban Bantu infants suggests that the amount provided is adequate for protection In an earlier study on 12 Bantu milks (over 1 month post partum) Mr M Kropman[8] found the average value for vitamin A to be slightly higher and for carotene thiamine and riboflavine slightly lower than those given for white mothers.[7] While subsequent work may well confirm that the breast-milk of urban Bantu mothers has much the same average composition (for the nutrients determined) as that of white mothers, it must be borne in mind that the nutritional value of breast-milk may not be accurately reflected by such chemical composition As far as we are aware, no attempt has been made to compare by biological assay the nutritional value of normal milk from a malnourished mother with that from a well nourished mother For the nutrients we determined, no correlation was apparent between the nutritional state of the mother as assessed by the clinic medical officers and the composition of the breast-milk

This capacity of these Bantu mothers to produce apparently normal milk, and wholly to breast feed infants for long periods, raises some interesting points Firstly presumably the amount produced speaking generally is sufficient for the infant. Writing from Central Africa, Dr H C Trowell[9] has stated:

> Liberal breast feeding allows the child to grow well during the first six months Provided gruels have not been given too early the African baby appears to approximate to that of the European about the end of the sixth month he is happy and playful, and for one brief period in his life he achieves parity '

Local pædiatricians agree with this observation Next concerning the mother it is noteworthy that this ability to breast feed occurs in the absence of the highly nourishing diet usually recommended Since the lactation does not appear to be accompanied by an obvious loss in weight, it would seem unlikely that the mother's intake of gross protein is seriously insufficient. Further, with regard to calcium their intake is meagre; yet despite the drain that must take place, we have not found serum values for calcium to be low in prolonged lactation and neither tetany nor osteomalacia is reported. Has it been satisfactorily established that the maternal loss of calcium in lactation is deleterious per se and that an endeavour must be made to avoid or minimise it at all costs?

Assuming that our observations are confirmed by subsequent work, we suggest that either the rôle of diet in lactation is over-emphasised, or alternatively, the body has a greater capacity to adapt itself to an inferior diet than is usually believed Our observations also suggest that the low incidence of breast feeding among western white mothers can seldom be attributed specifically to the consumption of a poor diet. While it is gratifying to know that the present diet of these Bantu mothers does not prejudice the satisfactory performance of the particular function of lactation it must not be inferred that we therefore consider their diet to be adequate

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Nutrition Unit, Council for
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South African Institute for
Medical Research, Johannesburg

A. R. P WALKER
ULLA B ARVIDSSON
W L. DRAPER.

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[1] Macy, I. G., Williams H H Pratt, J P Hamil B M *Amer J Dis Child*, 1945, 70 135

[2] McLester, J. M. Nutrition and Diet in Health and Disease. Philadelphia, 1944

[3] Abrh, J *Brit. med J* 1940 i 154

[4] Antonov, A. N *J Pediat*, 1947 30 250

[5] Smith, C A. *Ibid*, p 229

[6] Williams C. D *Proc Nutrit Soc* 1946 5 127

[7] Macy, I G, Kelley H., Sloan, R The Composition of Milks National Research Council Bulletin Washington, no 119 1950

[8] Kropman, M. Studies in Vitamin Content of African Foodstuffs M.Sc thesis University of South Africa. 1946

[9] Trowell H. C *E Afr med. J* 1948 25 236

AN UNEXPECTED PROTEST

SIR,—It is good to learn that your journal is read in the Elysian Fields It is to be hoped that last week's letter will encourage publishers at once to produce a large edition of *Varieties of Religious Experience*—a wonderful and inspiring volume full of wit, fascinating, and as modern today as when it first appeared For fifty years it has been my constant companion, its chapter on healthy-mindedness has given comfort to innumerable patients who were heading for serious mental breakdown

It used to be said that Henry James wrote novels as hard to understand as philosophy, whilst his brother William wrote philosophy as attractive as a novel His book on *Varieties of Religious Experience* deserves wide circulation in these depressing times

London, W 1 AGNES SAVILL

"HEALTH AND THE CITIZEN"

SIR,—It is indeed rare that one finds occasion to criticise the book reviews which form so useful a feature of THE LANCET, but I am impelled to take issue with the reviewer of Dr J V Walker's thoughtful and stimulating book, *Health and the Citizen* Dr Walker writes as a medical officer of health and a Christian, and, from the experience of his life's work, about the health of citizens in a Christian or Western civilisation It appears then "neither fair nor accurate" (to borrow from the review) to complain that he does not discuss the spiritual influence of Mahatma Gandhi in India, nor public health activities in the Far East I suggest, too, that the reviewer reverses the intention of the book if he thinks the field surveyed has been used to build a universal, philosophy Dr Walker clearly has found his universal philosophy in the Christian Church, and he is applying its principles to the health problems of the people—an entirely different matter

May I add that this book impressed me so much that I have written a congratulatory letter to the author, which you will agree is an uncommon thing to do

Carshalton W P KENNEDY

THE TREATMENT OF PEPTIC ULCER

SIR,—Peptic ulcer is the commonest cause of admission to hospital for men between the ages of 15 and 65[1] and accounts for approximately 10% of the adult population of general hospitals in this country[2] The majority are admitted for the complications of hæmorrhage or acute perforation, or for surgical treatment, and only a small minority are admitted for medical treatment For every patient who comes in there are another three or four outpatients for whom medical treatment away from home might be considered if accommodation allowed.

Unfortunately the sheer size of the problem causes so much pressure of routine work on the X-ray department and on hospital beds that the organisation of therapeutic trials becomes extremely difficult It was, indeed, only with great difficulty that some of my beds were made available for Dr Richard Doll, and that an X ray session was organised by Dr Pygott, for the long-term study the first part of which was published in your issue of Jan 26 It is paradoxical that the surfeit of clinical material should so inhibit elementary clinical research in such an important medical problem It should be not only against traditional therapeutic conservatism that Dr Todd (Jan 19) should rail, but also against the inadequate facilities for clinical research on this problem in this country Dr Todd's iconoclastic communication is well written and stimulating, but it is essentially armchair philosophy, and one hopes that he will now accept responsibility for taking part in practical research with the energy shown by your subsequent contributors, Dr Doll and Dr Pygott and Dr Pulvertaft (Feb. 2)

Dr Todd quotes my views on treatment contribu to a general practitioner series where, naturally, set out the orthodox views, although at the time were engaged in therapeutic trials on the subject T traditional treatment of peptic ulcer represents collective experience of the ulcer population, amo whom the medical profession is well represent Although it may not always be applicable to individ cases, it should not be discarded until evidence has be obtained against it. In my view the solution to ulcer problem will be found in some unsuspected aet logical mechanism, but I believe that the final soluti will not make nonsense of traditional therapy

Department of Gastroenterology,
Central Middlesex Hospital,
London, N W 10

F AVERY JONES.

WAYS OF USING MASS RADIOGRAPHY

SIR,—In your annotation of Jan 26 you once ag focus attention on the differences of opinion as to h mass radiography should be used You comment th it would be a mistake to tie up all our mass radiograp units in the long term investigation of black spots

This would be not only a mistake but quite impract able and unrealistic in our present financial straits. seems clear that for many years no additional ma radiography units will be available for concentrat geographical surveys Also I cannot see that existin units can be transferred within a region for this purpos The travelling and subsistence expenses of the st over a period of years and the provision of new bas would not be entertained by hospital boards today

As I see it there can be very little, if any, expansion the mass radiography service within the next few yea We are thus compelled to cut out any idealistic grandiose schemes for its use We must make up ou minds how we are going to use the existing units *now* T my mind the mass radiography service cannot survive if remains aloof from the chest service The objective both is the same—the eradication of pulmonary tuberc losis If, for administrative reasons, they cannot g forward as one service, then at least they must be clo allies The two services must plan the anti tuberculosi campaign together in the light of present day conditions Mass radiography must take a much more active par in the search for new cases and not waste its resources in discovering the few inactive and fewer active case amongst employees of large firms, Civil Servants, local government staffs, or school leavers. Examination of whole populations, repeat examinations, and epidemiological surveys will have to wait until the position improves My predecessor, Dr Halliday Sutherland by his scheme for examining cases referred by general practitioners (Jan 19, p 152), found a yield of cases of active tuberculosis seven times greater than is usually associated with mass radiography surveys This may not be pure mass radiography, but it is worth while case finding I hope it will not be disapproved on the ground that it usurps the functions of the chest clinic Both services have one end in view, surely it does not matter how it is attained

The examination of practitioners' patients is easily organised in static units Mobile units when visiting a new area should give precedence to three groups—practitioners' patients, contacts, and the general public—and follow these with groups suggested by the local chest physician and medical officer of health I am sure the over-all incidence would then approach 10 active cases of tuberculosis per 1000 persons examined

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[1] Mackay, D Studies on Medical and Population Subjects, no 4 Hospital Morbidity Statistics H.M. Stationery Office, 1951

[2] Occupational Factors in the Aetiology of Gastric and Duodenal Ulcer By R Doll, F Avery Jones, and M. M. Buckatzsch *Spec Rep Ser med. Res Coun, Lond* no 276 H.M Stationery Office, 1951

There are three factors which in some districts hinder a firm alliance between the mass radiography and the chest services:

1. The relationship of the medical director of the mass radiography unit to the chest service will have to be clarified and his status improved My view is that he should take a small but active part in the work of the chest clinic

2. Many chest physicians have no first-hand knowledge of how a mass-radiography unit works and are unaware of its limitations; this can be easily remedied

3. The chest physician of an area is often singularly unhelpful in making positive suggestions regarding groups which should be examined, apart from practitioners patients, contacts, and the general public. If he could devote some of the time allocated to preventive work to visiting the workrooms, factories, and offices where his patients come from, he would be in a better position to suggest where surveys might be made with profit

Birmingham Mass Radiography Centre
L A McDowell
Medical Director

Sir,—I strongly support the views expressed by Dr Halliday Sutherland in his clear and informative article His conclusions, and concurrently those of Trenchard and Grenville Mathers,[1] agree with what has been carried out for years in Nottingham. It is high time that the chest service realised that mass radiography is being most wastefully misapplied

The mass radiography scheme was started by the Ministry of Health during the early years of the late war in anticipation of a steady increase in the incidence of pulmonary tuberculosis, such as had arisen in the 1914–18 war The fundamental purpose was the X ray examination of apparently healthy factory groups for the detection of early pulmonary tuberculosis so that patients could be treated and return to work of national importance thus sustaining the war effort These war time conditions no longer exist, and the scheme should now be reorganised on lines that will help to solve our present tuberculosis problems. It could be the spearhead of our attack on the tuberculosis problem

The aim of each mass radiography unit is to discover the maximum possible number of cases of active pulmonary tuberculosis (thus incidentally countering the criticism that such units are unduly expensive) This is possible only if the units concentrate on specially selected groups and such concentration is out of the question under the present policy of mobility It is becoming increasingly obvious that the more mobile the unit—and especially if it concentrates on such groups as the factory population—the fewer active cases will it find The units should be *static* or mainly *static* and should concentrate on groups where the incidence is known to be highest—i.e., on public sessions and on the general practitioners service'

The majority of mobile units discover active tuberculosis in 0·3–0·4% of people in the groups they examine Our public sessions discover active disease in 1·02% while our "general practitioners service' produces an incidence of 3·4%—nearly nine times the maximum incidence with a mobile unit[2] I believe that the former City of Nottingham Mass X ray Unit was the first in this country to establish a service for general practitioners; this began in April 1944 and its popularity has increased steadily both with the general public and with the practitioners. During the past year which was by no means the most fruitful the Nottingham unit examined about 40 000 people and discovered 255 unsuspected cases of active pulmonary tuberculosis This is *not* because tuberculosis is more prevalent in Nottingham than elsewhere, but mainly because the unit has concentrated on specially selected groups.

Some chest physicians dislike the use of a mass radiography unit for general practitioners sessions, because they think (quite wrongly of course) that the unit will set up in opposition to the chest clinic. We have, however, never found this to be the case in Nottingham, where our unit not only works in the greatest harmony with the chest clinic but also coöperates very fully with the thoracic unit and the various outpatient clinics of the general hospitals Mass radiography for these 'practitioner sessions' is relatively cheap compared with radiography by large films; and it also saves film, which is now scarce

Because of the shortage of large films the 75 mm size is becoming increasingly popular in chest clinics, but experts hold that for diagnosis it is not superior to 35 mm film It is therefore difficult to understand why existing mass-radiography units could not be used for this work, until the film shortage ends or until 5 in by 4 in X ray attachments are readily available If the mass-radiography service weeded out the normal from the abnormal chest case, the chest physician could spend more time on the suspected case, or on the treatment of the definite case, of tuberculosis.

Nottingham.
A. E Beynon

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1. Trenchard H. J Grenville-Mathers R *Tubercle*, 1952 33 20
2. Beynon, A E. *Med Pr* 1949 221 545 577 602

Sir,—I should like to endorse the view, expressed by *Dr Halliday* Sutherland, that there is more undetected pulmonary tuberculosis among patients of general practitioners than in any other group of the community

In the area of the Liverpool Regional Hospital Board we have three mass radiography units one of which situated in the centre of Liverpool, is static and deals with cases referred by general practitioners, National Service recruits, and selected groups from various establishments in Liverpool. This service to general practitioners has been in existence since July, 1945 and is greatly appreciated by them because, as Dr Halliday Sutherland points out, it is easier to persuade patients to attend for X ray examination than to attend a chest clinic which is still associated in their minds with tuberculosis, and there is less delay

Some idea of the popularity of the X ray service can be gleaned from the fact that 17 185 cases were referred by general practitioners in the year 1950 The number of cases of active pulmonary tuberculosis discovered amongst these doctors cases was 495 (243 males and 252 females)—i.e. 28·8 per 1000 as against 3·34 per 1000 from other sources.

These doctors cases showed lesions of varying extent *and chronicity, and many gave a history of bronchitis* and so must have been a source of infection to others. If the primary purpose of mass radiography is to detect cases of pulmonary tuberculosis, it is just as important that it discover sources of infection as early cases There can be no more fruitful field than the X ray examination of cases referred by general practitioners, and the provision of a static unit in the larger cities has much to commend it

Liverpool.
J A Rushworth
Adviser in Mass Radiography
Liverpool Regional Hospital Board.

Sir,—Your issue of Jan 26 contains a number of references to mass radiography' including an annotation Dr Tattersall's prize essay and a letter from Dr Hoffstaedt It is apparent that understanding of the problem is seriously impaired by some confusion in the use of certain words which are used with different meanings at different times. We should like to define certain terms as follows

Mass radiography—The examination by means of X rays (including the use of normal or miniature films or fluorography) of the general population or of large groups of the population

Miniature radiography—The taking of miniature films

Mass-miniature radiography—Mass radiography by means of miniature films

Mass radiography unit—An organisation consisting of a team of workers employing an X ray apparatus for mass radiography (Usually they are equipped with apparatus which can take miniature films)

Selective radiography—The examination by X rays of individuals from a group or population selected for examination on a basis of symptoms or for some other reason

The surveys reported by Toussaint and Pritchard[1] Sutherland,[2] and Trenchard and Grenville-Mathers,[3] dealing with patients referred for radiography by their practitioners, involve selective radiography and should not properly be described as mass radiography The use of normal or miniature radiography in different surveys is immaterial it is only the means and not the essential principle of the process The number of subjects examined is comparatively small, and should usually be capable of being dealt with by a chest clinic with its own X-ray apparatus or other existing X-ray departments Questions of convenience or cost may make the use of miniature film apparatus worth while Besides 35 mm film, 45 mm, 70 mm, and 4 in by 5 in types are manufactured The employment of a mass radiography unit for the type of selective radiography under discussion would appear to be wasteful, although the examination of some patients, selected for radiography for any particular reason, at a convenient moment in a mass-radiography programme might be well worth while

When considering the proper employment of mass radiography teams, it is important to remember that the confusion in many minds between mass radiography and miniature radiography (which are *not* the same) has led to suggestions that contacts, pregnant women, school staff, &c, should be the targets selected It is true that radiography is required for these groups, but the process is surely selective radiography Suggestions have been made for the employment of mass radiography teams as a vital preventive weapon[3–5] They should not waste their strength in travelling from one area to another in comparatively small "sampling" surveys, but should be concentrated, several units together, in particular areas regarded as black spots A mass radiography unit has on its staff not only technicians to operate the apparatus, but liaison officers charged with the duty of recruiting examinees The concentration of units in a comparatively small geographical area should, with adequate publicity and sufficient apparatus, lead to a fairly high response of volunteers for examination—the aim being to examine every adult The benefit looked for is not the discovery of early treatable cases (these are only a by-product) but the discovery of chronic infectious cases, which are the probable reservoir causing tuberculosis to be endemic It is only by discovering these cases and teaching them preventive hygiene (or isolating them if necessary) that real control of tuberculosis can be achieved

It seems probable that some of the essential basic concepts have been grasped by the North West Metropolitan Regional Hospital Board in their plan for Islington[6] The need for several, and not just one, mass radiography unit is, however, quite likely to prove a serious oversight

R GRENVILLE-MATHERS
Chest Physician, Harrow

H J TRENCHARD
Chest Physician Edgware

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1 Toussaint, C H C, Pritchard, E K *Postgrad med J* 1944, 20, 143
2 Sutherland, H *Lancet*, Jan 19 1952, p 152
3 Trenchard, H J, Grenville Mathers, R *Tubercle* 1952, 33, 20
4 Trenchard H J *N A P T Bull* April 1951
5 Tattersall, W H *Lancet* Jan 26, 1952 p 202
6 See *Lancet* Jan 19 1952 p 154

Medicine and the Law

Illegitimate Children and the Law

> "Concerning bastards," announces the preamble to Queen Elizabeth's Act of 1576, "begotten and born out of lawful matrimony (an offence against God's and Man's laws) the said bastards being now left to be kept at the charges of the Parish where they be born, to the great burden of the same parish and in defrauding of the relief of the impotent and aged true poor of the same parish, and to the evil example and encouragement of the lewd life, it is ordained and enacted "

THIS, the earliest of our laws dealing with illegitimate children, called the tune, and for more than four centuries we have sung in much the same key, though not, of late, with the same ferocious conviction The operative reason for treating the illegitimate child badly was never so much the sins of the parents as the cost to the parish. We see, from Shakespeare, that the bastards of great parents were used well enough, though even they seem to have been expected (Falconbridge is the glowing exception) to turn out badly

The present law governing the custody and maintenance of such children is the Bastardy Laws Amendment Act of 1872, and in the eighty years since that was passed our ideas about children generally have undergone some profound changes The Joint Committee on Psychiatry and Law, appointed by the British Medical Association and the Magistrates' Association, have no doubt[1] that considerable changes are necessary to bring the law into line with current thought and practice, and they recommend that a committee of inquiry be set up by the Government to investigate the bastardy laws and prepare the way for amending legislation

Among topics which need review, they say, are the effects on these children of the National Assistance Act of 1948 Before that the law required a husband to maintain not only the children of the marriage (and all children born during a marriage were presumed to be legitimate) but also any child of his wife born before marriage, whether legitimate or not This was a principle of the poor-law, and held even in the Poor Law Act of 1930 The National Assistance Act, however, replaces the provisions of the 1930 Act, and provides that a man shall be liable to maintain his wife and his children and a woman shall be liable to maintain her husband and her children - But a married woman cannot apply for a bastardy order against the father of an illegitimate child, and if her husband repudiates responsibility for a child of his wife's of which he has reason to believe he is not the father, then the child is not entitled to support from anybody but his mother, who may not be in a position to maintain him The committee feel that in these *circumstances a married woman* should be able to apply for a bastardy order *against* the father of th child, for there is no doubt that in this respect illegitimate children are worse off since the passing of th National Assistance Act

At present the maximum order which can be mad against the father is for £1 a week, and this can be ordere only by a magistrates' court The High Court has neve had any power to make a bastardy order, largely becaus such orders were made primarily to protect local rate children who were not likely to become a burden on th rates did not receive the attention of Parliament Th committee suggest that the High Court might be give power to make orders for the maintenance of illegitimat children without financial limits, but according to th means of the father and mother They also think th maximum amount which can be ordered by a magistrate court might well be raised to 30*s*, the sum ordered for child whose parents are separated Before the Marri

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1 The Law in Relation to the Illegitimate Child London Briti Medical Association 1952 Pp 25 6*d*

Women (Maintenance) Act of 1949 the amount which could be ordered for illegitimate children was higher than that for children of a marriage. It is unreasonable that it should now be lower.

The mother is sometimes at a disadvantage because during the hearing her evidence must be corroborated in some material particular. Often the defendant supplies such necessary corroboration either in his evidence or—more commonly—under cross-examination but he is under no obligation to attend the hearing unless he has been summoned as a witness in which case he comes as a witness for the complainant and cannot be cross-examined. Thus the case may have to be dismissed for lack of corroboration. The committee suggest that corroboration should only be necessary when having heard the cases of both parties, the court finds that no corroborative evidence has come to light.

Thus if the mother has established a prima facie case, but has called no evidence in corroboration the defendant should be invited to give evidence. If he refuses to give evidence or refuses to attend the court should be able to make an order against him. If he gives evidence and either then or under cross-examination corroborates the claimant's story this should satisfy the demand for corroboration. If his evidence does not supply the corroboration necessary the case should be dismissed; but this would not prevent the mother from making another claim if she finds later that she can produce corroborative evidence.

The duration of an order they suggest should be the same for illegitimate children as for children of a marriage where the parents have separated: that is that compulsory payments should be continued for children over 16 who are continuing a course of education or training. They make no recommendation about the difficult subject of blood tests but merely commend it to the attention of the proposed committee of inquiry. They discuss sympathetically the dangers of poverty to which the illegitimate child is exposed and which often result in his neglect, sickness or death and they welcome the clear ruling in the Adoption Act 1950 that payments under a bastardy order are to cease when a child is adopted. The illegitimate child is subject to specially adverse psychological influences, and is therefore less likely than the child born in wedlock to find the basic pattern for good emotional and social development in his own home: the committee quote figures which indicate that there is a greater risk of a child becoming a delinquent if he is illegitimate. They therefore urge that as far as possible every illegitimate child should be brought up in a home and a family.

The committee have approached their subject with humanity and a great sense of responsibility. Their report is a sound foundation for a fuller inquiry.

Appointments

ABOY, K. W., M.B. Glasg., D.P.M.: senior registrar in psychiatry Bristol clinical area.

HORTON, E. H., M.B., B.SC. Wales, T.D.D.: deputy medical superintendent Glan Ely Hospital.

JACO, W. T., M.A., B.M. Oxfd, M.R.C.P., D.C.H.: pædiatric registrar Southmead Hospital, Bristol.

MACLEAN, C. D. T., M.B. Glasg., M.R.C.P.E., D.M.R.D.: part-time consultant diagnostic radiologist Charing Cross Hospital.

ROTH, JOSEPHINE, M.R.C.S.: part-time second physician department of physical medicine Wembley Hospital.

ROGER, G. M., M.B. Glasg., D.T.M.&H.: M.O. Uganda.

STRIDE, S. D. K., M.R.C.S., D.A.: asst anæsthetist London Hospital.

Sheffield Regional Hospital Board:

MOORE, G. L., L.R.C.P.I.: asst chest physician with duties at the chest clinic, Leicester.

MUNRO, W. D., M.B. Edin., M.R.C.P., D.A.: consultant anæsthetist, Nottingham group of hospitals.

PYRAH, V. W., M.D. Lond.: consultant pathologist Leicester Royal Infirmary, Loughborough General Hospital and the Towers Hospital, Leicester.

The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies but candidates may normally visit the hospital by appointment.

Notes and News

NEEDS OF THE MENTAL HEALTH SERVICE

THE National Health Service Act states in its preamble that mental health is the responsibility of the community through Parliament equally with physical health, and this, the Socialist Medical Association feel[1] is an outstanding event in our social history. Certainly there is now a widespread though uninformed curiosity about mental ill health springing from new insight into mental mechanisms, new methods of treatment, and a new spirit in the mental hospitals.

The association note that in some respects the mental health services have grown considerably in recent years. Attached to most general hospitals there are now outpatient departments for the treatment of psychiatric illness. The public are less afraid of mental hospitals than they used to be and more ready to use them, and a growing number of general hospitals are admitting for short periods, patients with psychological disorders. The mental-hospital psychiatrists are no longer shut off from the world of medicine by their hospital walls, and they are gaining greatly as doctors always do from the chance to exchange ideas with colleagues in other branches of medicine. Unfortunately, as the association point out, the same is not true for nurses. Most general hospital nurses never attend the mentally ill and most mental nurses have never had the chance of working in a general hospital. Finally preventive psychiatry has hardly been developed at all as yet.

The size of the problem deserves earnest thought. There are a quarter of a million people in England and Wales in hospitals or institutions or under supervision, for mental illness or mental defect. Many thousands more are in need of treatment which can be provided only in mental hospitals but they or their relations are still too prejudiced to use them. Moreover the hospitals are not large enough to deal with the volume of work they might appropriately do. If they are to develop new treatments and become centres of research they need (the association insist) capital development funds and the opportunity for long-term planning. It is easy to go all the way with the association in this opinion, and also to agree that such a desirable state of affairs is virtually impossible to achieve under the present financial system. But it is not so easy to support their view that "we can and will afford" to do these things, and must "force the administrators to admit that we cannot afford not to do them." They are undoubtedly right in saying that the prevention and early treatment of mental ill health would be an economy in the long run; but unfortunately we may be in the position, so familiar to the poor, of not being able to afford an economy which demands an initial outlay.

It is of course wise and right to be thinking in the meantime what we will do when the chance comes; and to this end the association are planning a series of public conferences. Among the subjects they suggest for discussion are the loss of industrial man power by mental ill health (and a third of all the ill health comes under this heading); the treatment of minor cases by the general hospital outpatient department and the family doctor; the need for health centres served by a team in which one member has special training and experience of psychiatry; the need for hostels for those who do not need full hospital care, such as old people who are only slightly disturbed mentally, delinquents, adolescent problem cases, and some types of mental defectives; a review of the law relating to mental illness and deficiency and especially of methods of certification; and education of parents in the profound preventive value of a stable and peaceful environment in the early years. They point out, too, that modern psychiatric knowledge is not yet used sufficiently in law-courts and suggest that the method used by the Army before courts martial of getting an independent psychiatric opinion for the guidance of the court might serve as a model. The present mental health service is poorly integrated; it could be closer knit, they think, if it had better representation at the regional hospital board and Ministry of Health levels.

A NEW JOURNAL

THE first two numbers of the *Great Ormond Street Journal*, the proceedings of the Hospital for Sick Children, set a high standard both in the matter and the manner of its presentation. The journal is to appear twice yearly and will be restricted to contributions from past and present members of the staff. Of especial interest in the issues for 1951 are an account by Dr Bernard Schlesinger of the effects of A C T H. and cortisone on Still's disease, and two papers, by Dr David Lawson and by Dr J L Greaves and Dr R G Welch; on the treatment of gastro-enteritis at Great Ormond Street during the years 1948–50 Such a début and the success which it promises will bring further honour to an already distinguished hospital The journal is published by H K. Lewis at 7*s* 6*d*

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[1] Mental Health. Published for the Socialist Medical Association by Today and Tomorrow Publications Ltd., 80 Rochester Row, London, S.W.1. Pp. 11. 3d.

SCOTTISH DEFENCE UNION

In its report for 1951 the council of the Medical and Dental Defence Union of Scotland remarks on a tendency for junior members of hospital staffs to be entrusted, without supervision, with operations that are beyond their experience "Several cases have occurred during the year where major operations have been performed by members below the grade of Registrar with disastrous results, largely due to the operator concerned undertaking a procedure that is beyond his experience and competence " Furthermore, whereas in England recent judicial decisions seem to suggest that the employing authority may have to bear responsibility, in Scotland the law still is that a doctor who treats a patient, whether in hospital or not, is himself alone responsible for any negligence or lack of skill During the year the union's membership increased by 450 to 7189 , but, in common with other defence organisations, the union has had to increase the subscription to meet rising costs

FILMSTRIPS ON BREAST-FEEDING

Under *the influence of Dr H K. Waller's methods and* of the vogue for visual aids in teaching, three groups of filmstrips *on breast-feeding, for instruction of medical students* and pupil midwives, have been prepared for the department of child health, Guy's Hospital, London These admirable pictures include some which would not readily be found elsewhere—for example, those of dissected breasts, the series showing a woman expressing colostrum by hand, and the radiographs of a baby's stomach before and after eructation The strips can be used to make a series of 2 by 2 in lantern-slides , and individual bromide prints for epidiascope work are also available The accompanying notes are excellent These filmstrips were made by the department of medical illustration at Guy's Hospital, and by Dr Brian Stanford , and they are being distributed, at 25*s* the set or 10*s* for each part, by Dr Stanford, 54, Upper Montagu Street, London, W 1

University of Oxford

On Jan. 24 the following degrees were conferred

D M —Miles Weatherall

B M —J D Abrams, J R Billinghurst, H E Emson S B Furness, M. I Harris, I A Hill, *D E P Jones, M J A Menage G J Renwick, R G Tucker

* In absentia.

Medical School Dinner —This will be held in Worcester College, Oxford, on Saturday, March 15, at 8 P.M Tickets (27*s* 6*d*) may be had from the secretary of the school, University Museum, Oxford

University of Cambridge

On Jan 26 the following degrees were conferred

M B , B Chir —* J F Andrewes G S Banwell * A C Beatty, * A P Blower, * D M J Burns, * Dudley Churchill Davidson, Gwenhwyfar Cole, M J F *Courtenay* R V Fiddian, * J C B Fenton R T Gaukroger * H M Gough Hugh Gough Thomas, P S Greaves G P Greenhalgh, E B D Hamilton, Alison M Harington. * D L Harrison, * M. W A Haward * J F Higgins, J D M. Howat, * R L Huckstep, R F Ingle * Russell Keeley, * J W E Mark, * K J Martin, * Christine M Maxwell, * N A Miles * Adham Ahmad El Nakeeb, T F D Oram * Anton Paneth, G W Pearson Juno M. Phillips, * P F Plumley, * K. E K. Rowson * C W Savile * L P Shell, * J A. J Smith * J L Somervell, * P H Swinhoe, * K A Taylor, G T Whitaker

* By proxy

University of London

The title of professor of biochemistry has been conferred on Mr W T J Morgan, D SC , F.R S , in respect of the post held by him at the Lister Institute of Preventive Medicine

University of Manchester

Prof Walter Schlapp has been appointed dean of the medical school

Dr E L Patterson has been appointed senior lecturer in anatomy, and Dr F A Langley in special pathology

Royal College of Physicians of London

At a comitia of the college held on Jan 31, Dr W Rus Brain, the president, announced the award of the Conwy Evans prizes to Sir Gordon Holmes, F.R.S , and Prof S P Bedson, F.R S

Dr W D W Brooks and Dr K Robson were appointed examiners in medicine, and Sir George McRobert examiner in tropical medicine

The following candidates having satisfied the censors' board were elected to the membership

Henry Barcroft, M D Camb , R A Barker, M B N.Z., B Bonalm, M.B Lond , T J Bresnahan, M.D Queen's Univ , Ontario, D J Charley, M D Lond., R S Crow, M B Aberd, P S Darl M.B Camb F E Dische, M B. Lond , R A Douglas M B Melb., M. D Ellenberg, M B Lond , M G Fitzgerald, M B. Birm Alber Freedman, M B Sydney, W M Fyffe, M D Glasg , A O M. Gilmore, M B N Z , G L Glasgow M B N Z, J H B Glyn, M.B. Camb., G J Goldberg, M B Witw'rsrand, J H Gough M.B. Camb., C H Gray, M D Lond O P Gray, M B Birm., Zaida M. Ha B M Oxfd J I E Hoffman, M B Witw'rsrand, Kenneth Hu Jones, M D Lond D H Isaac, M.D Lond , A M Johnson M B. Lond., T W G Kinnear, M B Edin , P J B Landy M.B Queensland, H G L Lloyd Thomas, M B Camb Margaret R. Miller, M.D Lond., James Parkyn, M B Lond , Faith C Poles, M B Lond H Raffan M D Aberd , A P Roberts, M.B Lond , G A Ro B M. Oxfd, I P Ross M B Lond , lieutenant R.A.M.C., R. E. Ross, M B Leeds, J T Scott, M.B Lond , Gostha Bihari Sinha, M B. Calcutta, L B Strang, M B Durh , Paul Strickland M B Lond., David Sutton, M D Manc. Brenda D Van Leuven M.B. Lond., F W Walton, M B Sydney, W R Wardill M B Camb , Alfred Wiener, M B Lond ; J A. O Wilson, M.B Edin.

Licences *to practise were conferred upon the following* 135 candidates (111 men and 24 women) who have passed the final examination *of the conjoint board*

Abdool Cader Dawoop Abdool Raman, L D Abrams, Pauline A. Adams R. K. Allday A H Askew, Margaret E Atkins, Elizabeth R. Bakirgian, A H Barker, D T C Barlow, W G Barry, F J A. Bateman, Bella Bernstein, Joan M Bishop A S Blake, H M J Bogaerts C J Booth, P A. Bramley, Louise A Brandman D W Bray, L H Brearley, L G Brewster A M Brown, C. G Brown, Hilda M Brunt W A J Bufton, C V Bullen F D U Burges T K H Burnham D M J Burns, B R. Carson, Stephanie J Carter, O E Channon A R Coghan, L G Couch Barbara M. St. J. Coventry Edward Davies, Y H de la Bastide, E M Dougla M. L Ellis, J R Evans Andrew Fairley, L M. Fenton Kenneth Firth, Freda Fleischer, R T Gaukroger, A H Goodspeed, Henry Graham, K L Granville Grossman Elizabeth I Greenlaw, J D T. Griffiths, W G Griffiths, J W Hallowell A C Helme, Josephine C M. Heylen, J B Hickling, E P Hilary-Jones, J A Hofmeyr, P N A Holden, D J C Horwood, D J Hosking, E G Hughes, Moinuddin Mohiyuddin Husainee, P F Kapff S G Kent, G A. Kerr, R. S Lamble, A V Large Phillip Lobon, Ian Lennox-Smith, W G Lewis, W H McBay, D A. F McGill, C L Mansfield, G A Marin, Elsa M. Mellor Morag J R Millar, J A. S Mitchell, Eleanor Morrison E A Murray, Joan M. Newton Margaret A. Norman, Okoronkwo Kesandu Ogan, H B O'Neill P B M. O'Reilly R B Parker, Gillian F Peacock, F O P Pearce, R. P Pearson B J Penry, Anne T A Phillips, D W L Phillips K. R. S. Pool T P S Powell, G H D'A Power, Sylvia F Prebble J H. Price, R J H Pritchard Anne M. Rankon, D S Robinson, Joseph Robinson A. R Roffo, B H Ross E M Rosser E N Rudland G J Ryder, Harry Schapira G G Scott Janet E Sharp, N E. Shaw, F C Shelley, Arnold Sladen, E D Sonnenfeld, G B Sparke, E M. Sproston, Frank Stacpoole Ryding Mary J Starbuck G F Stone, David Stuart, G V Sutton, G G Tandy, Patricia M. Thompson, M E Tunstall, A S Viner, G W Waddy R S Wambeck, R W Ware C D Weeks, B K Wharton G T Whitaker, D C Wilkins, D F Woodhouse, R J H. Xavier, J E York. Syed Anwar Ali Zaidi L M Zinkin.

Diplomas were conferred, jointly with the Royal College of Surgeons, on the candidates named in our issue of Jan 19, p 166 The D P H *was also conferred on*

Jagdish Prasad Agrawal, Frances C Myatt, T A Pace, A G B Singleton, W J Smither, E D H Williams

Royal College of Surgeons of England

A tablet *has been erected in the vault of St* Martin-in-the-Fields Church to commemorate the fact that John Hunter's remains rested there from 1793 till 1859, *when after* long and diligent search by Frank Buckland, M R C S , they were found and transferred to Westminster Abbey A service will be held in the church on Thursday, Feb 14 (John Hunter's birthday) at 11 A.M *for the unveiling of the tablet by* Sir Henry Dale, O M , F.R S , and its dedication by the Dean of Westminster *An explanatory address* will be given by Sir Gordon Gordon-Taylor Any doctors or others who are interested will be welcome at *the service*

Faculty of Anæsthetists —The annual general meeting of the faculty *will take place at the* college in Lincoln's Inn Fields, London, W C 2, on Wednesday, March 19, at 4 P.M At 5 P M Prof R R Macintosh will deliver the Joseph Clover lecture on Antecedents of Early Anæsthetic Apparatus. The lecture is open *to all doctors*

Royal College of Physicians of Ireland

On Feb 1 the following were admitted to the *membership* of the college

Ramakant Chimanlal Desai E. G Fox J P R Rees

Medical Society of London

The annual dinner of this society will be held at Claridge's London, W 1, on Thursday March 6 at 8 P.M. Further particulars may be had from the registrar of the society 11, Chandos Street, W.1

Colonial Medical Research Studentships

The Secretary of State for the Colonies is offering a limited number of studentships to graduates who wish to prepare themselves to take up medical research appointments in the Colonial territories. Further particulars will be found in our advertisement columns.

East Anglian Postgraduate Course

The Cambridge University Medical School is holding a symposium on tuberculosis and other diseases of the chest at the Clinic Castle Hill Cambridge on Saturday Feb 16 at 10.15 A.M. The course is open, without fee, to general practitioners whose names are on the National Health Service list Further particulars may be had from the secretary of the school, the Naval Hut, Downing College Cambridge.

W.H O Budget

The Executive Board of W.H.O., meeting in Geneva has unanimously recommended to the Fifth World Health Assembly the adoption of an $8 490 000 budget for 1953 as proposed by Dr Brock Chisholm the director general. This figure represents an increase of $812,000 over the budget for the present year

British Standards

Standards have been issued for spring interior mattresses (hospital type) (B.S 1810/1951) and bordered mattresses (hospital type) (B.S. 1818/1951) and also for linen textiles for use by hospitals and local authorities (B.S 1781/1951) Copies of these standards (mattresses 2s textiles 2s 6d) are obtainable from the British Standards Institution, Sales Department, 24, Victoria Street, London, S W 1

Conference on Fatigue

From March 24 to 27 at the College of Aeronautics Cranfield, the Society of Ergonomics is holding a symposium on fatigue. The opening speakers are to be Sir Frederic Bartlett F.R.S., and Prof. G P Crowden. Other speakers will include Prof. R. C Browne Dr W S Ladell, Dr O G Edholm and Prof Ancel Keys. Further particulars may be had from the secretary of the society Mr S H. Mound 71 Princes Square, London, W.2.

Salaries of Medical Superintendents

The salaries of the 380 medical superintendents of hospitals in England and Wales have now been settled by an industrial court award. Superintendents who are graded as consultants or senior hospital medical officers and spend at least 32 hours a week in clinical work will receive the appropriate clinical scale; the salaries of those wholly engaged on administrative duties will be not less than £1350 a year and not more than £1750 Superintendents, whose duties are partly clinical and partly administrative will receive a salary proportionate to the first two awards.

Medical Research Council Fellowships

The council invite applications for the following travelling fellowships for 1952–53 :

Rockefeller Travelling Fellowships are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad before taking up positions for higher teaching or research in the United Kingdom The stipend of fellowships tenable in the United States will be at the rate of $2600 per annum for a single fellow and of $3600 per annum for a married fellow. Travelling expenses and some other allowances will also be paid

Eli Lilly Travelling Fellowships are tenable in the United States on terms and conditions similar to those for the Rockefeller fellowships

Dorothy Temple Cross Research Fellowships in Tuberculosis are to give opportunities for study or research to qualified British subjects "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis." The stipend will be at the rate of £650 per annum for a single fellow and of £900 per annum for a married fellow

Forms of application may be had from the secretary of the council, 38 Old Queen Street London S W 1 with whom applications must be lodged not later than March 15

Institute of Almoners

The annual general meeting of the institute will be held on Friday, March 28, at 6 P.M at B.M.A House Tavistock Square London, W C 1 when Miss P Hornsby Smith parliamentary secretary to the Ministry of Health will speak

Industrial Health Research Board Reports

Most of the reports in this series familiarly known as pink reports, have been out of print for some years. The demand for some of them has continued and it has now been decided that these should be reprinted Three titles are now on sale again at H.M. Stationery Office

No 31.—A Contribution to the Study of the Human Factor in the Causation of Accidents by E M. Newbold.

No 61 —The Nervous Temperament, by Millais Culpin and May Smith

No 77 —Fatigue and Boredom in Repetitive Work, by S Wyatt and J N Langdon assisted by F G L. Stock.

Others will follow in due course

Commonwealth Scientific Conference

The United Kingdom delegation to this conference, which will open in Canberra on Feb 18, will include Dr F H. K. Green as representative of the Medical Research Council. The main object of the conference is to further collaboration in research throughout the Commonwealth. The medical subjects to be discussed include: climatic physiology with special reference to living conditions in the tropics; the effect of radioactive tracers on living cells in plant and animal research; medical biochemistry with particular reference to the standardisation of methods of examining blood-constituents; the geographical incidence of dental caries; and geographical anthropometry

Institute for Tropical Medicine in Liberia

The results of a successful investigation into human trypanosomiasis carried out in 1944–45 in Liberia by the American Foundation for Tropical Medicine and the Harvard Medical School led Mr Harvey S Firestone jun. to create a fund of $250 000 to enable the foundation to build a permanent research institute in Liberia, as a memorial to his father the late Harvey S Firestone. The Liberian Republic has provided a site at Harbel and on Jan 11 Dr Thomas Mackie president of the foundation, inaugurated the dedication ceremony of the new institute Other speakers included Brigadier James Simmons, dean of the Harvard School of Public Health, and Dr Joseph Togba director of public health and sanitation of the Liberian Republic. Dr Thomas C Burch has been appointed director of the institute, and a small scientific staff is already in residence

Proposed Medicosociological Research Unit in London

The premises of the former Pioneer Health Centre Peckham have passed into the hands of London County Council; and last Tuesday the council was asked by its health committee to approve a recommendation that a medicosociological research unit should be set up at this place now known as Queen's Road Health Centre Camberwell The general aim of the unit is to be the study of conditions required for the healthy development of the family and its members, and the extent to which medical and associated social services provide these conditions. Among the early problems that it is hoped to investigate are: (1) the definitions and assessment of morbidity (2) means of attaining maintaining and enhancing health; (3) means of dealing with morbidity; and (4) means by which the needs of the family can best be met with particular reference to the family doctor of the future The research will be based on (*a*) the members of the family club which it is proposed to establish at the centre under the council's powers as the local education authority; (*b*) those persons who attend the clinics day nursery and other activities provided at the centre together with their families and the families served by the health visitors working in the neighbourhood; and (*c*) the patients of local general practitioners, whose coöperation it is hoped to secure The governing body which is to be independent might the committee suggests, include a representative of the court of governors of the London School of Hygiene and Tropical Medicine The director should be a medical practitioner "of maturity and outstanding ability"; and his salary would be in the region of £2500 a year

Les Bases Biologiques de la Personalité

Prof Marc Klein, who holds the chair of biology in the Faculty of medicine at Strasbourg, will give a lecture on this subject in French at the French Institute, 15, Queensbury Place, London, S W 7, on Tuesday, Feb 19, at 6 P M

Prizes for Medical Films

The *Presse Médicale* is offering prizes, including one of 100,000 francs, for the best amateur films of medicosurgical teaching The films must be unpublished, not subsidised, and not produced by any laboratory or firm Candidates should apply to the secretariat of the *Presse Médicale*, Librairie Masson, 120, Boulevard Saint-Germain, Paris 6e, before March 1

Education for Mental Health

The Central Council for Health Education is holding a residential weekend seminar on this subject for medical officers of health and health education officers at Southlands College, Wimbledon Park Side, London, from April 18 to 22 The principal speaker will be Dr H V Dicks Further particulars may be had from the director of the council, Tavistock House, Tavistock Square, W C 1

EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1240 The proportion admitted was 81 3% A white warning was issued on Feb 4 In future when a warning has been issued it will be retained for at least three days and also until the admission-rate rises at least 1% *above the critical figure* A white warning is imposed when the admission-rate falls to 82 5%, a yellow warning when it falls to 80%, and a red warning when it falls to 75%

The order of Al Rafidain (class III) has been conferred on Lieut Colonel W R M Drew, O B E , R A M C , for his services as professor of medicine at the Royal Iraqui College of Medicine

The London Churches Group has issued a *Handbook to the Social Services in London* which contains a summary of the social services provided by the Government, the local authorities, and voluntary bodies Copies may be had (6*d* , post free 7½*d*) from the council, 7, Bayley Street, Bedford Square, W C 1

CORRIGENDA *The Kidney of Scleroderma* —In the letter last week from Dr J A. Milne and his colleagues, 3 hydroxy 2 phenyl cinchoninic acid was incorrectly spelt

Surgical Treatment of Hyperfunctioning Lesions of the Adrenal Cortex —In this lecture by Prof Waltman Walters, published last week, the 3rd line of the 3rd paragraph in the first column on p 223 should start with the words "no history of endocrine abnormality" Line 12 of the same paragraph should open with the words "body in every one of ten cases "

Births, Marriages, and Deaths

BIRTHS

LAWS —On Jan 20 at Sheffield, to Dr Pamela Laws (formerly King), the wife of Dr John W Laws—a daughter

LONBAY —On Jan 20, at West Runton, Norfolk the wife of Dr E Leiser Lonbay—a daughter

MACKAY —On Jan. 28, at Welwyn Garden City, the wife of Dr E V Mackay—a daughter

PRIEST —On Feb 3 at Leamington Spa, the wife of Dr Michael Priest—a daughter

PRITCHARD —On Jan 28 at Farnborough Hants, the wife of Dr John Pritchard—a son

SCOTT —On Jan 20 at Taplow, the wife of Lieutenant T G Scott, R A M C —a daughter

SMITH —On Jan 24 at Ealing, the wife of Dr Redmond Smith—a daughter

STRADLING —On Jan 31, in London the wife of Dr Peter Stradling—a son

DEATHS

CORMACK —On Jan 31 at Felpham Sussex Harry Slater Cormack M C F R.C S E lieut colonel, I M.S retd

HENRY —On Jan. 31 at Macduff, Banffshire, Herbert George Murdoch Henry, M D Lond formerly of Sheffield and Birmingham

O'NEILL —On Feb 2 Charles Sefton O Neill M D Manc aged 70, of Hale Cheshire

PEARSON —On Jan 31 in London, John Sidney Pearson, M A M D Camb aged 75

THORNTON —On Jan 29 at East Knoyle, Salisbury, Gerald Earl Thornton M B E B M Oxfd aged 65

Diary of the Week

FEB 10 TO 16

Monday, 11th

MEDICAL SOCIETY OF LONDON 11, Chandos Street, W 1
8 30 P M Prof. A Bradford Hill D SC Dr F Avery Jones Assessment of Therapeutic Trials

INSTITUTE OF PSYCHIATRY, *Maudsley Hospital* Denmark H S E 5
5 30 P M Dr E. Stengel Lecture demonstration

Tuesday, 12th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S W 1
5 P M. Dr V H Springett An Interpretation of Statistic Trends in Tuberculosis (First Milroy lecture)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene Keppel Street, W C Dr J M Tanner Growth of the Human at the Time Adolescence

INSTITUTE OF DERMATOLOGY, St John s Hospital, Lisle Stre W C 2
5 30 P M Dr B F Russell Lupus Erythematosus

CHELSEA CLINICAL SOCIETY
8 30 P M (South Kensington Hotel, 41, Queen's Gate Terrac S W 7) Sir Jack Drummond, D SC F R S Starvation.

MANCHESTER MEDICAL SOCIETY
5 P M (University of Manchester) *Section of Surgery* Pr R Milnes Walker Portal Circulation

Wednesday, 13th

INSTITUTE OF DERMATOLOGY
5 30 P M Dr R W Riddell Mycology—Allergy and t Serological Diagnosis of Fungus Infections

MANCHESTER MEDICAL SOCIETY
4 30 P M (University of Manchester) *Section of Patholog* Dr E G Hall Dr A. Macdonald Toxoplasmosis

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242 St Vince Street, Glasgow C 2
5 P M. Prof Andrew Wilson Myasthenia gravis (Watson lecture

Thursday, 14th

ROYAL COLLEGE OF SURGEONS Lincoln s Inn Fields, W C 2
5 P M Sir Lancelot Barrington Ward Swellings of the Nec in Childhood. (Hunterian lecture)

ROYAL COLLEGE OF PHYSICIANS
5 P.M Dr Springett An Interpretation of Statistical Trend in Tuberculosis (Second of two Milroy lectures)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene) Dr Donald Hunter Methods of Research in Industrial Medicine

INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Gre Ormond Street, W C 1
5 P M Mr A B Wallace Burns

INSTITUTE OF DERMATOLOGY
5 30 P.M Dr Henry Haber Histopathology of Bullou Eruptions

ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corne S W 1
4 30 P M Dr L T Hilliard Psychiatry lecture-demonstration

ALFRED ADLER MEDICAL SOCIETY
8 P M (11 Chandos Street, W 1) Dr James Moore *Th* Aims of Therapy

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant Liverpool,
8 P M Dr R M B MacKenna *Some Problems in Dermatology*

UNIVERSITY OF ST ANDREWS
5 P M (Medical School Small s Wynd Dundee) Prof J L Henderson The Child s Heritage

Friday, 15th

UNIVERSITY COLLEGE, Gower Street, W C 1
5 30 P M Mr F Bergel D.SC British Contributions in the Field of Pharmaco therapeutics

INSTITUTE OF DERMATOLOGY
5 30 P M Dr B F Russell Lupus Erythematosus—clinical demonstration

INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY
5 30 P M (London School of Hygiene) Dr Paul Wood Pulmonary Stenosis

FACULTY OF RADIOLOGISTS
2 15 P M (Royal College of Surgeons) Dr George Simon The Lateral Position in Chest Tomography Dr G D Locke Carcinoma of the Middle lobe Bronchus

EUGENICS SOCIETY
5 P M (26 Portland Place W 1) Dr J A Fraser Roberts The Genetics of Mental Deficiency

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8 P M (Hammersmith Hospital, Ducane Road, W 12) Clinical meeting

Saturday, 16th

BIOCHEMICAL SOCIETY
11 A.M (London School of Hygiene) Symposium on Lipid Metabolism

THE ENDOCRINE CONTROL OF THE BLOOD-SUGAR *

C N H. LONG
M.D., Sc.D

STERLING PROFESSOR OF PHYSIOLOGICAL CHEMISTRY IN YALE UNIVERSITY, NEW HAVEN, CONNECTICUT

A NORMAL man or woman can ingest several hundred grammes of carbohydrate a day without the level of glucose in the blood rising much above 160 mg per 100 ml The same person can subsist on a diet containing practically no preformed carbohydrate, or may even fast for many days without the blood glucose falling much below 70 mg Thus with a dietary intake of carbohydrate ranging from 0 to 500 g a day, the corresponding variation in the blood glucose level is only 90 mg per 100 ml This indicates that the factors regulating carbohydrate metabolism are unusually precise in their operation and are such that at no time does the level of glucose in the blood fall below a certain minimum or rise to excessive heights.

Although I am dealing here with the influence of endocrine organs on carbohydrate metabolism, it must be remembered that their hormones are not the only factors responsible for the regulation of this metabolism Other organs of the body play essential rôles in the maintenance of normal metabolism Indeed, the hormones do not initiate metabolic transformations but merely influence their rate

PHYSIOLOGICAL MECHANISMS CONTROLLING THE BLOOD-GLUCOSE LEVEL

The level of glucose or any other metabolite in the blood is a resultant of the rates of those processes which either add it to or remove it from, the blood

Glucose is made available to the tissues either by the carbohydrates or the proteins of the diet, or in the fasting state from the katabolism of the tissue proteins themselves, and it is largely utilised by the skeletal muscles and, to a more limited extent by the other organs of the body

The processes of digestion leave in the intestinal canal for absorption into the body a mixture of the three monosaccharides glucose, fructose, and galactose, together with those amino-acids which by later transformations can serve as a source of blood glucose Since fructose and galactose are readily transformed into glucose after absorption the main problem of carbohydrate metabolism is largely that of the metabolism of glucose

Intestinal Absorption of Glucose

The rate of absorption of glucose from the intestine is largely independent of its concentration and is effected by specific metabolic processes in the intestinal wall which are such that the quantity of glucose absorbed by the mucosa is within the assimilatory capacity of the tissues. This may be regarded as the first in a series of processes that prevent the blood glucose from rising excessively while much carbohydrate is being ingested The rate of glucose absorption is affected by endocrine factors, for it is decreased in hypophysectomised animals —a defect that is corrected by the injection of thyroxine (Russell 1940) Furthermore thyroidectomy or hypothyroidism in man is also associated with decreased absorption of glucose, and either experimental or clinical hyperthyroidism increases the rate considerably (Althausen and Stockholm 1938) In other words, the rate of intestinal absorption of glucose is adjusted to the metabolic rate of the tissues. Changes in the composition of the diet also alter the rate of intestinal absorption of glucose since this is most rapid on a high carbohydrate diet and slowest on a low-carbohydrate diet Since changes in the composition of the diet alter the relative activity of those members of the endocrine system concerned with the control of metabolism we may gain from a study of the intestinal absorption of glucose some insight into the regulation of carbohydrate metabolism

Formation of Glycogen by Liver

The next organ in the body that participates in the supply of glucose to the tissues, and hence influences the blood glucose level, is the liver which not only retains a considerable portion of the absorbed glucose as glycogen for future needs but also (which is of even greater importance) forms glycogen from non carbohydrate substances (gluconeogenesis) and hence adds glucose to the blood at times when either no food is ingested or the diet contains but little preformed carbohydrate. Here again the rate of glycogen formation, as well as the rate of its release to the circulation is significantly affected by endocrine factors. For instance, it is well known that adrenaline, and probably a hyperglycæmic factor from the pancreas, accelerate glycogenolysis (Sutherland 1950) Insulin influences the rate of formation of glycogen from glucose and the rate of formation of carbohydrates from the products of protein katabolism (gluconeogenesis) is under the control of the adrenal cortical hormones (see below)

Rôle of Kidneys

The kidney tubules also play an important if not always appreciated part in the regulation of blood glucose. It is well known that all the glucose of the plasma is filtered into the glomerular fluid whence under normal conditions it is completely reabsorbed into the circulation by the specific activity of the renal tubules. The metabolic processes involved in this transfer of glucose across the tubular cells are probably very like those operating to transfer glucose across the intestinal mucosa At any rate their capacity to remove glucose from the glomerular fluid is limited to a maximum which may be exceeded when too much glucose is presented to them This maximal absorptive capacity is influenced not only by continued exposure to high glucose levels in the glomerular fluid often expressed by the so-called raised renal threshold in diabetes, but also apparently by the activity of the endocrine system. Thus it has been reported that the maximum renal absorptive capacity for glucose is increased in hyperthyroidism and certain adrenal steroids are said to decrease it. The classical example of the effects of interference with tubular reabsorptive capacity is that of phlorizin poisoning Here the inhibition of reabsorption produced by phlorizin not only lowers the blood glucose level but also forces the organism to make good the urinary loss of glucose by an enhancement of gluconeogenesis.

The kidney also shares with the liver the ability to form glucose from carbohydrate sources. How important a contribution this may be to the maintenance of blood glucose is not exactly known but recent studies indicate that in some circumstances it may be fairly large.

Summary

We may conclude at this point that the rate of entry of glucose into the circulation is regulated by the activity of three organs: the intestine the liver and the cells of the proximal renal tubules. Among these the liver is the most important since it not only releases its preformed stores of glycogen but also manufactures glucose for the needs of the body from smaller molecules.

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* The 1951 Banting memorial lecture of the Diabetic Association.

derived from the intermediary metabolism of either proteins or carbohydrates.

UTILISATION OF GLUCOSE BY TISSUES

Glucose, whether derived from the diet or furnished to the body by the liver, is utilised in the tissues by three main methods of metabolism.

(1) The first of these is transformation to glycogen either in the liver or in the muscles. Though the subsequent course of degradation of glycogen is different in these tissues, the muscle glycogen only indirectly serving as a source of blood-glucose, the synthetic mechanism appears to be the same in both. The most important step in utilisation of carbohydrates is the formation of glucose-6-phosphate from glucose. This reaction, which is catalysed by the enzyme hexokinase, has been suggested by the Coris and their colleagues (Cori 1945–46) as the point upon which both insulin and an unidentified anterior-pituitary hormone exert their effects. Their experiments suggest that the pituitary factor inhibits this enzyme—an effect that would reduce the utilisation of glucose in any form and lead to the accumulation of it in the blood. Insulin, on the other hand, is said to remove the inhibition imposed by this pituitary hormone, and would in consequence increase glucose utilisation.

(2) The second method of utilisation of glucose is oxidation to carbon dioxide and water by a preliminary series of transformations by which either a three-carbon derivative (pyruvic acid) or an unknown two-carbon compound is formed. Either or both of these is next oxidised by a series of enzymes and catalysts in steps known as the tricarboxylic-acid cycle. This cycle is also believed to be the final common oxidative pathway for the intermediary metabolites derived from the katabolism of fatty acids and proteins.

(3) The third method of utilisation of carbohydrates, and one about which least is known, is the formation of fatty acids. This transformation, as Stetten and Boxer (1944) have shown, is quantitatively the most important. The fatty acids formed in this manner may be stored to an almost unlimited extent in the fat depots or may be more immediately utilised for the needs of the organism.

These, then, are the main methods of glucose utilisation and consequently variations in the rate of these processes will largely determine not only the height but also the direction of change of the blood-glucose. Indeed, the regulation of the blood-glucose level by the hormones is affected by influencing these metabolic transformations in the various tissues of the body.

EFFECT OF INSULIN ON UTILISATION OF CARBOHYDRATES

The importance of insulin in preventing an excessive rise in blood-glucose is due to its capacity to accelerate the utilisation of carbohydrates in the tissues. It is the only hormone that does this, since all the others either do not affect the blood-glucose level or else increase it.

The work of recent years has shown that insulin has an effect on all three main methods of carbohydrate utilisation. Thus, it increases the formation of glycogen from glucose both in the muscles and in the liver. In the liver this effect may be masked if the insulin is contaminated with the hyperglycæmic factor from the pancreas. The possible participation of insulin in the hexokinase reaction has already been mentioned.

Insulin has also been shown to participate in the processes by which glucose is converted to fatty acids. In its absence from the body the amount of dietary glucose transformed into fat is reduced to some 10% of the normal rate (Stetten and Boxer 1944, Brady et al 1951, Chernick and Chaikoff 1951).

The participation of insulin in the cyclic changes that result in the complete oxidation of glucose intermediaries to carbon dioxide and water has also been suggested. At present, however, there is no unequivocal evidence that insulin directly catalyses any of the reactions of the tricarboxylic-acid cycle.

The participation of insulin in the formation of fatty acids allows some deductions to be made about the well known relation between obesity and diabetes in man. In a person maintaining a constant body-weight the energy represented by the food intake is balanced by that expended in the bodily activities. It may be assumed that the transformations undergone by carbohydrates or their metabolites require that the pancreas furnish a certain quantity of insulin a day to accomplish them. On the other hand, a person who habitually ingests carbohydrates and other foodstuffs in excess of his daily energy requirements deposits fatty acids in the depot areas of his body. The fatty acids formed from carbohydrates, but not used, nevertheless require an amount of insulin over and above that needed by those who maintain a constant body-weight, and this insulin to all intents and purposes is wasted. In other words, the continual and unnecessary addition of fat to the body stores may be regarded, in its effect on the pancreas, as equivalent to a partial pancreatectomy. Furthermore, when it is remembered that this addition of unnecessary quantities of fat goes on for months and years, it is perhaps not surprising that ultimately the islet tissue becomes unequal to the demands on it. The insulin deficiency will develop insidiously and at least for a time may be corrected if measures are taken to restrict the food intake to a point where excessive fat is not stored in the body. That this can occur has been shown by Newbergh, whose success in the restoration of normal carbohydrate tolerance in a proportion of obese diabetics is well known. It is also reflected by the recognition that an important part in the treatment of obese diabetics is to restore their normal body-weight before attempting exact appraisal of their insulin requirements.

On the other hand, it is equally apparent that in some other obese diabetics the functional impairment of the islet cells may have proceeded to the point where merely restoring the body-weight to normal still leaves them with a deficient production of insulin. In such cases only the administration of insulin can restore their requirement for this hormone.

Lawrence (1951) has named the diabetes associated with obesity "lipoplethoric diabetes." His explanation of the high incidence of diabetes in the obese middle-aged man or woman differs somewhat from that given above. He suggests that hyperglycæmia and glycosuria are a reflection of the deficient capacity of the overloaded fat cells to form more fat from carbohydrate. It may well be that the point of breakdown in the metabolism of these people is in the peripheral tissues, but it seems equally possible that the fragile cells of the islets of Langerhans are the first to yield.

Some work done in my laboratory on the effects of experimental obesity on carbohydrate tolerance illustrates that many of the consequences of obesity in man may be reproduced experimentally in animals (Brobeck et al 1943).

Suitable bilateral hypothalamic lesions produced by electrolysis in the brain stem of rats or of monkeys leads to the rapid development of enormous obesity. In this way it is possible to produce rats weighing over 1000 g and to increase the body-weight of macaques from 3 to 18 kg in a few weeks.

The cause of the obesity is the intense voracity that develops as soon as the lesions are inflicted. These animals are short-lived, often develop renal and vascular disease, and furnish an interesting confirmation of the deteriorations of body function too often found in man as a consequence of excessive indulgence in food.

Some of these obese animals develop a progressive impairment of carbohydrate tolerance, which in the rat is noteworthy because in this species the pancreas more resistant to insult than it is in other species the pancreas of the rat has been partly removed but t so much as to cause glycosuria, the voracity and esity that follow such brain lesions are at once reflected the appearance of glycosuria. Of greater importance the observation that, after the obesity has persisted a while, reduction of food intake to normal levels no ger brings about a disappearance of glycosuria. So as can be judged, the fat metabolism of these animals normal, and the conclusion is that the impairment of rbohydrate tolerance is a consequence of a relative ficiency of insulin

MAINTENANCE OF BLOOD-GLUCOSE LEVEL DURING FASTING

The importance of maintaining a minimal blood ucose level of about 70 mg per 100 ml when either food is available or the diet contains no preformed rbohydrate is, in the higher forms of life, to be tributed to the obligatory requirements of the nervous stem. An animal deprived of the capacity to maintain adequate supply of glucose soon succumbs, and death attributable to the failure of this tissue only since the her tissues of the body are quite able to exist when no ucose reaches them through the blood stream

There are two ways in which the organism can maintain e blood-glucose during such periods: (1) the formation glucose from non-carbohydrate precursors, largely oteins and their derivatives; and (2) reduction of the ilisation of glucose to the minimum essential for the aintenance of the nervous system Both mechanisms e influenced by the endocrine system

The chief clue to the nature of this endocrine control furnished by a comparison of the effects of fasting normal and on hypophysectomised animals. For ample, a normal rat may fast for days without developg serious hypoglycæmia but the hypophysectomised t dies in a few hours. If simultaneous observations e made on the liver glycogen it will be found in hypoysectomised animals that, as soon as the glycogen falls a low level characteristic of fasting the blood glucose so begins to fall This does not happen in normal imals, even when the liver glycogen is reduced to an qual degree, indicating clearly that the effect of the echanisms responsible for the maintenance of the lood-glucose level is greatly reduced in the absence of he pituitary gland. It is the loss of the anterior lobe of he hypophysis that is responsible for the effects bserved.

Another striking difference between the behaviour of ormal animals and that of hypophysectomised animals in the effect of fasting on the muscle glycogen In ormal animals, even fasting to the point of death, the uscle-glycogen level, after an initial fall, is maintained ut in hypophysectomised animals the muscle-glycogen vel rapidly falls. This indicates an abnormally rapid onsumption of carbohydrate during a time which, in ormal animals, is associated with a minimal utilisation f this substance This is also suggested by the high spiratory quotient maintained by these animals while sting

The remarkable amelioration of pancreatic diabetes ssociated with removal of the anterior lobe of the ituitary is well known

The metabolism of total diabetes and that of the asting state have many points of similarity: indeed, in retrospect the effects of hypophysectomy on total diabetes might have been deduced by knowledge of its effect on fasting

Both in diabetes and in fasting there is an increased ate of gluconeogenesis from protein a decreased utilisation of carbohydrate, and an increased utilisation of stored fat. The chief difference is that in diabetes the blood-glucose level is excessively high whereas in fasting it is at the lower limit of normal Hypophysectomy produces in both conditions a fall in the fasting blood glucose a decrease in gluconeogenesis during fasting and an increased utilisation of carbohydrate Further, the injection of crude extracts of anterior pituitary not only exacerbates the mild diabetes of hypophysectomised depancreatised animals but also confers a normal resistance to fasting on hypophysectomised animals

These experiments, although they do not tell us whether it is the lowered rate of gluconeogenesis or an inability to reduce carbohydrate utilisation that is responsible for the inability of the hypophysectomised animal to sustain a fast or for the amelioration of a total diabetes at least clearly indicate that the hormones of the anterior pituitary have a considerable influence on one or both of these processes.

METABOLIC HORMONES OF ANTERIOR PITUITARY

The further analysis of the effects of loss of the anterior lobe of the pituitary gland on carbohydrate metabolism and of those following injections of crude extracts of anterior pituitary, is made difficult by the fact that the pituitary secretes at least six hormones—the two gonadotropic hormones, the thyrotropic hormone the adrenocorticotropic hormone (A.C.T.H.), the lactogenic hormone and the growth hormone.

The gonadotropic hormones and the thyrotropic hormone may be excluded from further consideration because removal of the gonads or of the thyroid does not reproduce either sensitivity to fasting or any amelioration of total diabetes The lactogenic hormone seems to be of little importance as a regulator of carbohydrate metabolism in the mammal—judging by the failure of highly purified preparations to influence the blood glucose or the diabetes of the Houssay animal. The exclusion of these four hormones leaves for further consideration A.C.T.H. and the growth hormone Since A.C.T.H. can only influence metabolism by its capacity to increase the rate of secretion of adrenal cortical steroids, it is necessary before it also can be excluded, to consider the influence of the adrenal cortical hormones on carbohydrate and protein metabolism

ADRENAL CORTEX AND CARBOHYDRATE METABOLISM

It has been known for many years that both patients with Addison's disease and animals deprived of their adrenal glands often develop hypoglycæmia The susceptibility of adrenalectomised animals to the development of hypoglycæmia while fasting although not so marked as in hypophysectomised animals, is very evident Furthermore, it is accompanied at least in the fasting adrenalectomised rat, by a diminished rate of urinary excretion of nitrogen. This is not due to a failing renal function since it is observed in animals receiving adequate amounts of sodium salts and water while fasting Since the quantity of urinary nitrogen is a reflection of the amount of non-carbohydrate precursors available to maintain the blood glucose level, these results indicate that in the adrenalectomised animal the development of hypoglycæmia during fasting is partly due to the decreased rate of gluconeogenesis from the tissue proteins

This concept is supported by the quantitative study of the effects of the injection of adrenal cortical extract or of steroids of the cortisone type into fasting adrenalectomised rats (Long et al. 1940) There is a significant rise in the blood-glucose level and a tenfold to twentyfold increase in liver glycogen without any change in the amount of muscle glycogen Consequently the katabolism of tissue protein must have been accelerated, and this is confirmed by the observation that there is increased urinary excretion of nitrogen during the injection period which fact suffices to explain the new carbohydrate found in the body fluids and the liver

It might be argued that the above experiment is merely another example of the efficiency of substitution therapy and affords no proof of the direct participation of adrenal cortical hormones in gluconeogenesis However, comparable injections of these hormones into normal fasting rats also is followed by an accumulation of liver glycogen and slight hyperglycæmia, and by a considerable increase in the urinary excretion of nitrogen, again sufficient to explain the extra carbohydrate found in the injected animals

When fasting hypophysectomised rats are injected with adrenal cortical extract, the blood glucose level is maintained and the amount of liver glycogen is increased However, the increase in liver glycogen is much less than in normal animals, even though the urinary increase of nitrogen is as great At the same time the low muscle-glycogen level found in fasting is not improved by treatment with cortical hormones These two points of difference in the response of hypophysectomised animals —a smaller increment in liver glycogen and a persistence of subnormal muscle-glycogen levels—indicate that not all the defects in the fasting metabolism of hypophysectomised rats can be repaired with adrenal cortical hormones Since the administration of crude anterior-lobe extracts restores the normal state, it seems clear that it is not only the A C T H -content of these extracts but also some other anterior-lobe factor that is required for the establishment of the normal fasting metabolism Some insight into the nature of this factor may be gained from the observation that a high rate of utilisation of carbohydrates still persists in fasting hypophysectomised rats treated with cortical hormones This may be deduced from the smaller increment in liver glycogen and the persistence of subnormal muscle-glycogen levels

Nevertheless, there is little doubt that A C T H and the adrenal cortical steroids are a major factor in enabling animals to maintain the blood-glucose level while fasting They apparently accomplish this by accelerating the rate of protein katabolism and hence make available intermediary metabolites that are converted into liver glycogen At present it is not known at what point in the chain of these reactions the hormones exert their effect It could be in the breakdown of the proteins to amino-acids, or in the de-amination of the amino acids, or in the conversion of the carbon residues to liver glycogen

The importance of a simultaneous depression of carbohydrate utilisation and an increased rate of glyconeogenesis in maintaining the blood-glucose level has been pointed out above The influence of adrenal cortical hormones on carbohydrate utilisation in the tissues is most easily demonstrated in animals subsisting on a high-carbohydrate diet, since any changes are more easily detected It has been clearly demonstrated that in these circumstances the 11 oxygenated adrenal steroids and A C T H depress the utilisation of carbohydrate and, if treatment is continued, cause a temporary diabetic state characterised by resistance to insulin

It has already been pointed out that the similarities between the metabolism of fasting and that of total diabetes might have allowed a prediction to be made that, since hypophysectomy modifies the response of the organism to fasting, it would also attenuate a total diabetes Such a prediction was, of course, not made, and it is only since the pioneer work of Houssay that we have come to appreciate the fact that the endocrine control of certain metabolic transformations manifests itself both in fasting and in total diabetes

The same hypothetical line of reasoning would also have led us to predict, from the effects of adrenalectomy on fasting, that adrenal deficiency would also modify total diabetes Certainly Lukens and I were stimulated by other considerations when we made our experiments on the effects of adrenalectomy on pancreatic diabetes (Long and Lukens 1936) We intended then to determine whether or not some of the effects of hypophysectomy were due to the atrophy of the adrenal cortices that was known to follow this operation in animals

The results obtained with cats and dogs, and later with rats, showed clearly that a very significant modification of the diabetes followed the removal of all adrenal cortical tissue This was particularly evident in the fasting state and was comparable in degree to that observed after hypophysectomy in these species It was later shown that A C T H exacerbated the diabetes of hypophysectomised depancreatised animals, and that adrenal cortical hormones exacerbated the diabetes of adrenalectomised depancreatised animals It was therefore concluded that at least a part of the effects of hypophysectomy on diabetes were due to the inhibition of adrenal cortical secretion that followed the loss of A C T H

It was tempting to assume that all the effects of hypophysectomy were due to this cause, but it soon became clear that this was not so Houssay and his colleagues, as well as the Yale laboratory, have shown that, if a crude extract of anterior pituitary is given to adrenalectomised depancreatised animals, whether maintained on sodium salts or by small doses of cortical extract, the glycosuria promptly increased Since such animals could not increase their supply of cortical hormone, the only possible conclusion was that the anterior-pituitary extracts contained another "diabetogenic" factor that exerted its effect independently of the adrenal cortex This second factor is now believed to be the growth hormone

EFFECT OF GROWTH HORMONE ON CARBOHYDRATE METABOLISM

A large part of the analysis of the effects of hypophysectomy on the metabolism of fasting or in diabetes has had to await the separation and characterisation of the various anterior-pituitary hormones Consequently it was not until fairly recently that preparations of the growth hormone, essentially free from the other anterior lobe hormones, became available for experiments This separation was accomplished first by Li et al. (1945) and at Yale by Wilhelmi et al (1948) It was soon found, in confirmation of earlier work with impure preparations, that the injection of growth hormone into fed animals not only brought about a considerable retention of nitrogen (protein synthesis ?) but also, if continued, was followed by evidence of an inhibition of carbohydrate utilisation So far it has been found that growth hormone (1) depresses the respiratory quotient of fasting hypophysectomised and fed normal rats, (2) prevents the severe loss of muscle glycogen observed in fasting hypophysectomised animals, and (3) depresses the glucose uptake of the isolated diaphragm In addition, when given to partially depancreatised rats or to animals made diabetic with alloxan, it exacerbates the diabetes Finally, the diabetogenic potentialities of growth hormone have been amply proved by Houssay and Anderson (1949), Cotes et al (1949), and Campbell et al (1950), who have all shown that the injection of 10–20 mg of growth hormone produces permanent diabetes in dogs and cats The production of permanent diabetes, as Young (1937) had previously shown with crude anterior lobe extracts, is undoubtedly due to irreversible damage to the islets of Langerhans

There is still much to be learned of the effects of growth hormone on metabolism Since it is intimately related to one of the least understood metabolic processes, the synthesis of protein, we shall probably have to await information on these processes before a more accurate analysis of its function can be given For example, the relation between its capacity to suppress carbohydrate utilisation and to augment protein synthesis is signally obscure In certain circumstances it exhibits a *hypoglycæmic* rather than a hyperglycæmic action For instance, when growth hormone is given to fasting animals, the blood glucose soon falls to subnormal levels an effect that may be related to the reduction of protein katabolism and hence to a diminution in the quantity of carbohydrate precursors. Continued injection (see above) causes a reversal of this and the appearance of hyperglycæmia There are also still unsolved questions as to its effect on the secretion of insulin Hypoglycæmia after the injection of growth hormone into normal fasting animals may be due to stimulation of the secretion of insulin and the rise in the blood glucose level of depancreatised animals may be due to their inability to secrete additional quantities of insulin

At present we must conclude that the growth hormone in certain circumstances can diminish the utilisation of carbohydrates and hence maintain the blood glucose level.

ADRENALINE AND CARBOHYDRATE METABOLISM

Twenty five years ago a discussion of the endocrine factors regulating the blood glucose level would have centred largely on insulin and adrenaline. Today the importance of adrenaline in this regard has been largely supplanted by new knowledge of the functions of the anterior pituitary and adrenal cortical hormones. Nevertheless, adrenaline is a hormone that is rapidly released in various circumstances and accelerates the rate of glycogen breakdown both in liver and in muscles In the liver glycogen is released to the blood stream as glucose, whereas in the muscles it is released largely as lactic acid which on reaching the liver is converted into glucose. The operation of this cycle enables the muscle glycogen to serve as an indirect source of blood glucose

Until recently the action of adrenaline on carbohydrate metabolism was believed to be limited to its capacity to make available the preformed stores of carbohydrate in liver or muscle for the maintenance of the blood glucose level. It has, however now been shown that adrenaline also brings about the release of A C T H from the anterior pituitary (Gershberg et al. 1950) Though the mechanism of this effect of adrenaline on the pituitary gland is not completely understood the fact that the release of A.C.T.H follows the release of adrenaline into the circulation is of some importance

Perhaps the best example of the effects of this linkage between the adrenal medulla and the anterior pituitary is furnished by the response of the organism to hypoglycæmia. In this situation the immediate restoration of the blood glucose level is essential for life.

It is well known since the classical work of Cannon that when the blood glucose falls much below 50 mg per 100 ml., adrenaline is discharged as a consequence of the irritating effect of the low blood glucose level on the centres in the brain-stem controlling its discharge. The adrenaline entering the blood-stream not only accelerates the discharge of any preformed liver glycogen as glucose but also with equal rapidity evokes a release of A C T H. from the pituitary A C T.H in turn releases additional quantities of adrenal cortical steroids, which (see above) have as one of their important metabolic effects the ability to accelerate the conversion of tissue proteins to liver glycogen The liver glycogen formed from the breakdown products of the amino-acids is then available to augment the blood glucose still further In this way the rapid mechanisms and a more slowly acting mechanism for the support of the blood glucose level are effectively linked. It seems that the ability of normal fasting animals with low liver glycogen levels to recover spontaneously from moderate insulin hypoglycæmia is due to their capacity not only to discharge their small stores of liver glycogen but also to supply all the glucose they require for recovery by an acceleration of protein katabolism When the blood glucose has by such means been restored to normal levels, the activity of both the adrenal medulla and the anterior pituitary is simultaneously suppressed

CONCLUSION

I have tried to point out that, though the blood glucose level is the result of processes by which glucose is added to the blood and of processes by which it is utilised in the tissues, the maintenance of the blood-glucose level within the rather narrow limits of normal is a consequence of a close interaction between those metabolic processes and the secretions of certain endocrine organs notably the pancreas, the anterior pituitary and the adrenals

The rate of utilisation of glucose in the tissues and hence the upper limit of the blood glucose level are largely determined by the secretion of insulin There is valid evidence that the secretion of insulin is increased by a rising blood glucose level, a type of regulation that seems to be admirably adapted to deal with the sudden entry of considerable quantities of glucose into the body

On the other hand the maintenance of a minimal blood glucose level is the result of a complex interplay between the secretions of the anterior pituitary, the adrenal cortical hormones and in some instances the hormone of the adrenal medulla. This interplay maintains the blood glucose level in three ways (1) the discharge of adrenaline makes available any preformed liver glycogen (2) the release of A C T H augments the secretion of the 11 oxygenated adrenal steroids one of whose functions is to accelerate the formation of glucose from non-carbohydrate precursors and (3) the suppression by these steroids of carbohydrate utilisation by the tissues (In this they may be reinforced by the anterior pituitary growth hormone or possibly by another still unidentified hormone from this gland) Though the mechanism responsible for the stimulation of anterior lobe function during fasting is obscure there is little doubt of its occurrence for in the absence of the anterior lobe of the pituitary the blood glucose soon declines to levels incompatible with life.

For our understanding of human diabetes the contribution of this new knowledge about the rôle of the anterior pituitary and adrenal glands in the regulation of carbohydrate metabolism lies in the light it throws on the chain of events begun when the insulin supply becomes deficient It is not too much to hope that, as our knowledge of the basic activities of these hormones and their interrelation to each other unfolds, this will also reveal to us the reason for the widespread incidence of diabetes in man

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A SIMPLE METHOD OF INTERNAL TOCOGRAPHY

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Uterine contractions have the immediate effect of raising intra-uterine pressure. They cause the cervix to dilate during labour and expel the fœtus or assist in its expulsion

A continuous record of intra-uterine pressure reflects very accurately the pattern of uterine behaviour It offers insight into many problems attending labour and affords the solution to some Characteristically the discovery of new facts precipitates in turn new problems It is so with tocography (i e , the recording of the forces concerned in childbirth)

Records of uterine behaviour are most valuable if they are accurate, sensitive, and easy to make during labour A method is described here which fulfils these requirements very closely.

EXTERNAL AND INTERNAL TOCOGRAPHY

Many types of external tocographs have been used to detect uterine action (Dodek 1932, Fenning 1942, Woodbury et al 1938) The method is indirect, for changes in uterine shape are detected through the abdominal wall by pneumatic, mechanical, or mechano-electrical devices. Disadvantages are that a proportion of the energy is spent in moving the parietes, and furthermore activity at one area is taken to represent the entire uterine action

Reynolds (1949) has used external multi-channel tocodynamometers with great effect, and has shown the varying contributions made by differing parts of the uterus. His concept of a coördinated uterus with a "gradient of activity" and "fundal dominance" has sprung from this He has shed light on the darkness of uterine inertia, and has recorded some of the defects of coördination which may cause the condition. His has certainly been the most fruitful method of external tocography.

Internal tocography has been effected largely by means of hydrostatic bags, placed within the uterus and communicating externally with measuring apparatus Even in 1872 Schatz made useful records in this way Much work of a similar nature has been performed by other workers (Bourne and Burn 1927, 1928, Moir 1934) Bourne and Burn (1927, 1928) used the method to investigate uterine behaviour, and to study the effects of drugs on the uterus In these experiments a small hydrostatic bag was placed between the uterus and the fœtal membranes above the presenting part. Records were obtained from a mercury manometer which actuated a pen writing on a revolving drum

Chassar Moir (1936), with extensive experience of internal tocography, ingeniously used the bag which Nature provides—namely, the placenta and cord of the first infant—when recording uterine behaviour during the birth of the second twin He confessed, however, that this technique had considerable limitations It was not usually possible to record second-stage contractions because the descending fœtal head occluded the cord. There were other inherent difficulties. Calculations and allowances for the correction of pressures were necessary However, the method certainly overcame the criticisms against the use of a bag , for it did not introduce the risk of sepsis, nor could it be regarded as a "foreign body" liable to act as an "irritant" and "so produce abnormal uterine activity"

Alvarey and Caldeyro (1950) passed a hollow needle through the abdominal wall, peritoneal cavity, and uterus into the amniotic sac. Liquor filled the needle, which was then connected to a measuring apparatus In this way intra-uterine pressure could be measured directly For obvious reasons recording had to be discontinued before the entire birth was completed They mentioned the possibility of striking the placenta, and emphasised the need to compress the puncture site after withdrawing the needle in order to prevent leakage of liquor into the

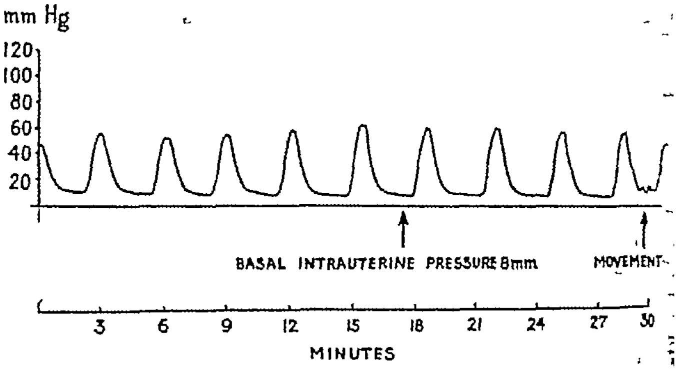

Fig 2—Record of normal first stage of labour

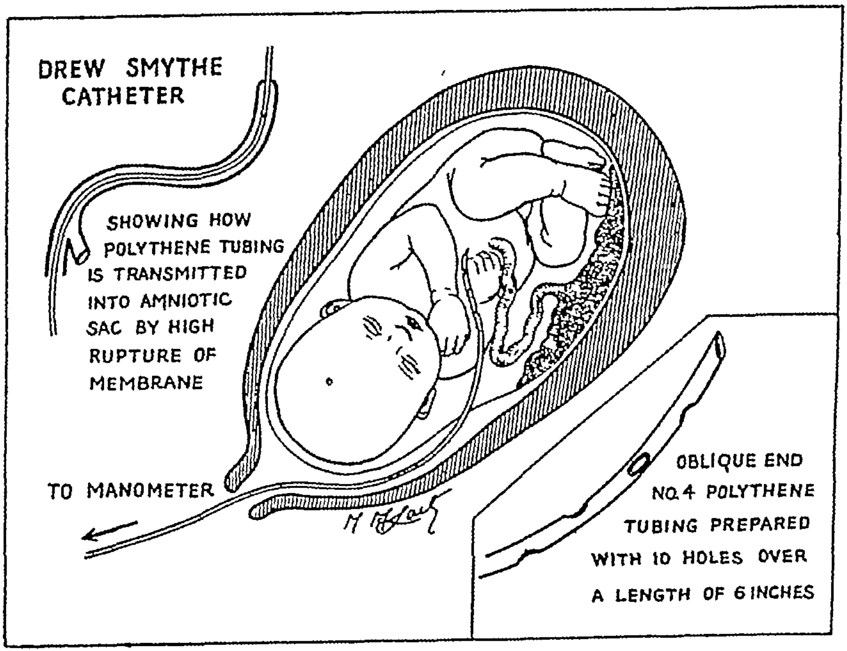
DREW SMYTHE CATHETER
SHOWING HOW POLYTHENE TUBING IS TRANSMITTED INTO AMNIOTIC SAC BY HIGH RUPTURE OF MEMBRANE
TO MANOMETER
OBLIQUE END NO.4 POLYTHENE TUBING PREPARED WITH 10 HOLES OVER A LENGTH OF 6 INCHES

Fig 1—Polythene tube in position

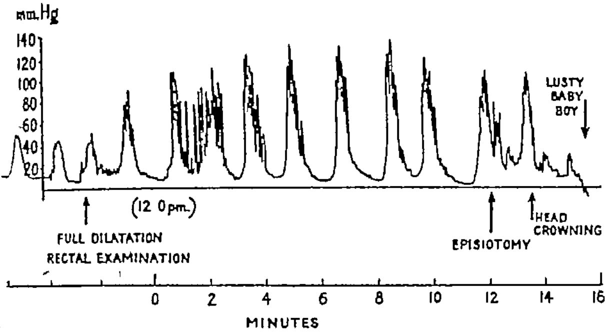

Fig 3—Record of second stage of labour

peritoneal cavity They claimed that there was no morbidity among the patients whose labours were recorded in this way We have personal knowledge, however, of one patient who died of complications following the formation of a uterine hæmatoma at the puncture site after transabdominal paracentesis for the relief of hydramnios. In the area department at Oxford blind puncture is regarded as hazardous, and the practice is to gain access through the cervix and to remove liquor by high rupture of the membranes if the patient is so distressed that intervention is necessary

THE OXFORD METHOD

A no. 4 'Polythene' tube * 2 metres long is prepared so that its end is cut obliquely The adjacent 6 in. of tube is perforated repeatedly, so that each hole is about equal in size to the cross section of the tube. The tube is introduced into the amniotic sac through a Drew Smythe catheter † kept in situ after it has effected high rupture of the fœtal membranes. The catheter is withdrawn and the tube left in position (fig 1)

The tube fills with liquor and can be connected to a mercury manometer, so arranged that its meniscus is at the level of the patient s symphysis pubis. In effect the amniotic sac is being used as a balloon which completely fills the uterus and which remains in position until the birth is completed.

Polythene is smooth and causes no discomfort, and the patient is unaware of its presence It resists compression and does not become occluded by the presenting part as it descends the birth canal.

The great advantage of this method is that records can be made until the birth is completed. The length of tube enables the patient to lie comfortably in bed, sit, or move freely without interfering with the record. 4 ml. of liquor completely fills the tube, and the passage of a further 3 ml. along it causes the manometer to move through its greatest range. The method has been found very reliable in practice. It has been suggested that it may cause intra uterine sepsis; but in 30 cases which we have studied, some for as long as forty-eight hours, there has been no morbidity

Although originally designed to study uterine action after high rupture of the membranes, the method has been used successfully after low rupture or after the membranes have ruptured spontaneously The presenting part occludes the cervix like a ball valve and though a trickle of liquor may escape this does not interfere with the record, which is a true reflection of intra-uterine pressure.

Simple measurements of intra uterine pressure can be made by introducing the tube into the amniotic sac and supporting the external portion vertically Liquor rises in the tube, and pressures can be measured in "centimetres of liquor" The specific gravity of liquor is about 1002 so that the height of a column of liquor is about 13 times the height of an equivalent column of mercury It has been the custom to measure from the level of the symphisis pubis so that comparisons could be made from patient to patient

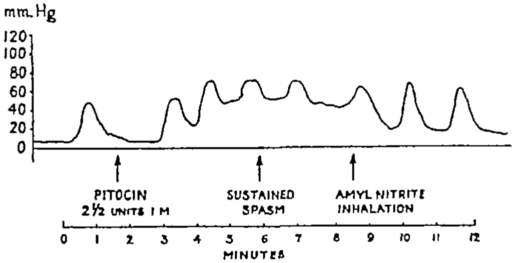

Fig 5—Record showing uterine spasm due to oxytocin ('Pitocin')

The basal intra-uterine pressure is on average about 10–12 cm of liquor equivalent to 8 mm. Hg During first-stage contractions it rises to 50, 95, or even 120 cm of liquor, equivalent to 40 70 or 90 mm. Hg During the second stage with strong expulsive efforts the intra uterine pressure may rise to 240 cm. of liquor, equivalent to 180 mm Hg

This very simple technique is probably the most accurate available for the study of intra uterine pressure (Reynolds 1951) It measures pressures directly, and there are no mechanical adjustments or extraneous pressure factors for which correction need be made

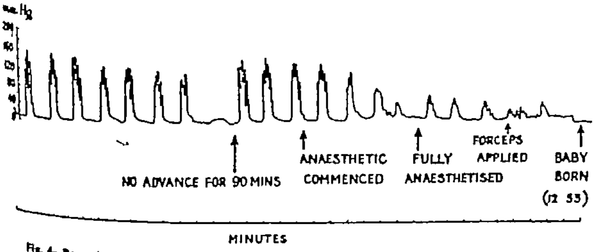

Fig. 4—Record of second stage of labour in a patient with failing expulsive powers.

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* Polythene tubing was supplied by Messrs. Allen & Hanburys Ltd.; and it was sterilised according to their recommendations. The perforations in the tube are best made with a scalpel or razor-blade guarded with adhesive strapping leaving only a small edge exposed this prevents cutting too deeply

† The end of the catheter was "bored out" until it was wide enough to take the tube comfortably

Measurement with a manometer and revolving drum offers the advantage of a permanent record Under these conditions the basal intra-uterine pressure is about 8 mm Hg First-stage contractions cause rises in pressure up to 40 or even 70–90 mm Hg, and second-stage contractions up to 120–140 mm Hg The highest value recorded has been 180 mm Hg when expulsive effort was maximal

For comparison typical values obtained by three methods are given in the accompanying table The results from the method described here agree closely with those from the method of Alvarey and Caldeyro (1950) Both methods depend on similar direct hydrostatic principles, and their accuracy derives from their simplicity

INTRA-UTERINE PRESSURE MEASURED BY THREE DIFFERENT METHODS

Method	Intra uterine pressure (mm Hg)		
	Basal	First-stage contractions	Second stage contractions
Chassar Moir (1936)	15	60	105
Alvarey and Caldeyro (1950)	8	35–100	100–180
Williams and Stallworthy (1952)	8	40–90	120–180

EXAMPLES OF RECORDS

The utility of the method may be judged from the reproductions of typical records in figs 2–5

Fig 2 shows the characteristics of normal first stage of labour The contractions are typically equal in intensity and duration, and occur regularly Systole is abrupt, and the pressure rises quickly The climax is maintained for a short time, and the pressure falls more gradually than it rose The record shows a basal intra-uterine pressure of 10 mm Hg The average intensity of contractions is about 60 mm Hg The frequency of contractions is 4 per 10 min

Fig 3 shows the whole of the second stage of labour, in a patient who had had one baby previously The basal intra uterine pressure was 8 mm Hg The average intensity of second-stage contractions plus expulsive effort was 130 mm Hg The frequency of contractions was 6 per 10 min

Fig 4 is taken from the record of a patient, who had already had one baby, whose labour was terminated by forceps after a delay of 90 min in the second stage due to a persistent occipitoposterior position Her powers were beginning to fail The effect of the anæsthetic was to eliminate second stage expulsive effort The record is continued until delivery was completed

Fig 5 is a small section from the record of a patient who had uterine spasm from injection of oxytocin ('Pitocin') The spasm quickly relaxed after the administration of amyl nitrite

FURTHER STUDIES

Work now in progress is concerned with some problems of inertia, and with intra uterine pressures in pre-eclampsia, in hydramnios, and in accidental hæmorrhage The effect of certain drugs on the uterus is also being investigated, and it is hoped to study the circulation of liquor amnii The Royal College of Obstetricians and Gynæcologists have awarded a Leverhulme scholarship to encourage further work along these lines

It is a pleasure to thank all who have helped in this work, especially the staff of the maternity department, Churchill Hospital, Oxford Prof J H Burn, F.R.S, very kindly loaned the recording apparatus Miss M McLarty made the drawings

References at foot of next column

NEONATAL SURGERY

EARLY TREATMENT OF CONGENITAL MALFORMATIONS

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> "If surgeons take sufficient interest in the surgery early life the advance in the near future can unpredictably great"—W E LADD

THIS paper attempts to ascertain the number of bab born with conditions which menace life during the neonat period and which are at least theoretically amenable surgery The area covered by the Liverpool Region Hospital Board has been taken as the field of investigatio and all babies born with urgent surgical conditions dur the year 1949 have been considered This series h been compared with a somewhat similar group of cas admitted to the Hospital for Sick Children, Great Ormo Street, London, in the same year

The Ministry of Health report on neonatal mortalit and morbidity states

> "Our knowledge of the causes of neonatal death is incon plete, and the prevention and treatment of some forms neonatal illness are far from satisfactory These subje offer great scope for research Many can play a part in th work, pædiatricians, obstetricians, anæsthetists, physiol gists, and social workers" (Ministry of Health 1949)

The surgeon might well have been included in this tea of workers

NEONATAL MORTALITY-RATE IN ENGLAND AND WALE

There has been a steady fall in the neonatal mortalit rate for England and Wales within the last forty yea (table I) Between 1906 and 1910 the figure was 40 pe 1000 live births, by 1949 it had dropped to 19 31 pe 1000 live births This remarkable improvement can b attributed to many factors the rise in the general soci status of the population, improved antenatal and post natal supervision, and the development of pædiatric have all played a part

In 1949 there were 730,518 live births in England an Wales (table I) and 14,106 deaths in the neonatal perio (19 31 per 1000 live births) The most important cau of death was *prematurity*, which accounted for 542 infants (7 40 per 1000 live births) As a result of improve antenatal care and obstetric technique the incidence o prematurity is steadily falling, and advances in pædiatric have improved the chances of survival of prematur babies

Asphyxia, with 2377 deaths (3 25 per 1000 live births), was the next most important cause of neonatal mortality

In 1943, Potter and Adair stated that in the U.S.A. *congenital abnormalities* occupied third place as a cause of neonatal deaths In the Liverpool Maternity Hospital, during the ten year period 1938–47 inclusive, 2 05% of the 20,479 live births were associated with congenital malformation, and 12 6% of the 475 neonatal deaths were due to congenital malformations In England and Wales, during 1949, 2056 children aged less than 4 weeks (2 81 per 1000 live births) were certified as having died of congenital malformations

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Deaths due to Congenital Malformations

Though the general neonatal mortality rate has fallen in the last fifty years the death rate due to congenital malformations has remained almost stationary This cause of death has therefore increased relatively in importance, and in 1949 14 58% of all neonatal deaths were due to congenital malformations Gaisford (1948) has commented that the fall in the neonatal mortality rate has been less than that of the infant mortality rate in the last thirty five years, and that this can be partly explained by the number of unpreventable deaths due to congenital malformations In my opinion many of these deaths are not unpreventable

Medical investigators have differed widely in their estimation of the proportion of deaths due to congenital abnormalities in the neonatal period The figures vary between 11% (Dobbs 1943) and 20·4% (Allen et al. 1943) The Ministry of Health (1949) points out that the figures published by the Registrar of Births and Deaths cannot be accepted unconditionally since in most cases the cause of death was not verified by necropsy Even necropsy may fail to reveal the true cause of death; for instance it is notoriously easy to overlook an œsophagotracheal fistula at necropsy (Belsey and Donnison 1950) The Ministry of Health (1949) therefore suggests that a figure of 5 neonatal deaths due to congenital abnormalities per 1000 live births is likely to be near the truth Should the over all neonatal mortality rate drop to 10 per 1000, which is theoretically possible (some of the Scandinavian countries are approaching this figure) 50% of all neonatal deaths would then be due to congenital malformations provided that the death rate due to congenital abnormalities remains unchanged

TABLE I—VITAL STATISTICS IN 1949

—	England and Wales	Liverpool region
Population	43 785,000	2 113,353
Total live births	730,518 (16 7 per 1000 population)	41 127 (19·4 per 1000 population)
Neonatal deaths	14 106 (19 31 per 1000 live births)	809 (19 7 per 1000 live births)
Neonatal deaths due to prematurity	5420 (7 40 per 1000 live births)	347 (8·44 per 1000 live births)
Neonatal deaths due to congenital malformations	2056 (2 8 per 1000 live births and *14 58*% of all neonatal deaths)	133 (3 23 per 1000 live births and *16 44*% of all neonatal deaths)

Almost all reports on neonatal mortality refer to congenital malformations as the hard core of the problem and state that little can be done to lessen them I challenge this pessimistic attitude

I do not suggest that the lives of all babies born with congenital abnormalities can be saved by even the most skilful surgery Severe degrees of spina bifida must be regarded as untreatable, and certain congenital heart lesions are at present fatal shortly after birth In view of the astonishing advances in cardiac surgery however, it seems possible that surgery may have something to offer to these patients in the not too distant future.

NEONATAL SURGERY AND MORTALITY IN THE LIVERPOOL REGION

The area covered by the Liverpool Regional Hospital Board and the United Liverpool Hospitals is very suitable for this survey because it is compact and has a population large enough to be of statistical value (2 113 353 in 1949) The last available complete set of figures were those for 1949 these were studied in detail There are twenty four hospitals with children s wards in the region, and fourteen hospitals had admitted newborn babies with urgent surgical conditions in 1949 In addition the neonatal records of eleven county and borough medical officers of health were scrutinised because the hospital records did not cover all the relevant cases.

TABLE II—NEONATAL SURGICAL CASES IN 1949

—	Liverpool	Great Ormond Street
No of cases	75	60
No of deaths	54 (*72*%)	29 (*48 3*%)
Boys	43 (*57 3*%)	39 (*65*%)
Girls	32 (*42 7*%)	21 (*35*%)
No of cases operated on	54 (*72*% of total) with 33 deaths (*61 1*% operative mortality)	58 (*96 6*% of total) with 27 deaths (*46 6*% operative mortality)
No of cases not operated on	21 all died	2 both died
No premature	31 (*41 3*% of total) with 25 deaths (*80 6*% mortality)	10 (*16 6*% of total) with 7 deaths (*70*% mortality)

In 1949 there were 41 127 live births in the Liverpool region (table I) 809 children (19 7 per 1000 live births) died in the neonatal period and congenital malformations accounted for 133 (16·44%) deaths Of these 133 deaths 54 (40 6%) were due to conditions amenable to surgery If the proportion for the country as a whole was the same, it is reasonable to assume that between 32 and 48% of the 2056 deaths due to congenital malformations in England and Wales would have profited by surgical treatment The size of the problem is therefore not insignificant since it concerned the lives of 650–980 children born in England and Wales in 1949

MATERIAL COLLECTED IN THE LIVERPOOL REGION

In this investigation certain conditions, in spite of their being congenital were excluded because, although surgery will ultimately be required, operation is not called for in the neonatal period Among those conditions were hare-lip and cleft-palate orthopædic and genital malformations spina bifida can rarely be benefited by operation soon after birth. So-called congenital hypertrophic pyloric stenosis is excluded because its present treatment is usually satisfactory

The conditions included in the group of neonatal surgical cases are mostly malformations of the alimentary tract requiring urgent surgery soon after birth In the Liverpool area 75 such cases were collected (table II) The diagnosis was confirmed in each of these 75 babies either at operation or necropsy Of these 75 babies 54 (72%) died: 21 were not operated on and all died; and of 54 operated on 33 (61%) died. Therefore the high mortality rate (72%) is partly explained by the fact that 21 children were denied surgery owing to failure to diagnose or to their being admitted moribund.

It is well known that there is an association between prematurity and congenital malformations. In Miller's (1950) series congenital defects were observed in 4 4%

TABLE III—DETAILS OF COLLECTED MATERIAL

Lesion	Liverpool		Great Ormond Street	
	No of cases	No of deaths	No. of cases	No of deaths
Intra-abdominal	23 (*30 6*%)	18 (*78 3*%)	14 (*23 3*%)	9 (*64 3*%)
Œsophageal atresia	8 (*10 7*%)	6 (*75·0*%)	8 (*13 3*%)	7 (*87 5*%)
Imperforate anus	8 (*10 7*%)	3 (*37 5*%)	11 (*18 3*%)	1 (*9 1*%)
Exomphalos	7 (*9 3*%)	6 (*85 7*%)	7 (*11 7*%)	3 (*42 9*%)
Obstructive jaundice	6 (*8 0*%)	5 (*83 3*%)	7 (*11 7*%)	4 (*57 1*%)
Diaphragmatic hernia	4 (*5 3*%)	3 (*75 0*%)	2 (*3 3*%)	
Spina bifida (urgent cases only)	7 (*9 3*%)	4 (*57 1*%)	2 (*3·3*%)	2 (*100·0*%)
Genito-urinary	2 (*2 6*%)	2 (*100 0*%)	4 (*6 7*%)	2 (*50·0*%)
Suppurative parotitis	2 (*2·6*%)	1 (*50·0*%)	1 (*1 7*%)	
Miscellaneous	8* (*10 7*%)	5 (*62 5*%)	3† (*6 7*%)	1 (*25·0*%)

* 3 cases of micrognathia (2 deaths) 2 urgent orthopædic lesions (2 deaths); 1 suppurating ethmoid (1 death) 1 lax œsophagus; and 1 empyema.

† 2 urgent orthopædic lesions 1 goitre (1 death); and 1 cystic hygroma

of all premature babies, the comparable figure for full-term babies being 1 3% In my series 41 3% of the babies with surgical conditions were also premature This may be another reason for the high mortality-rate in the region, but prematurity per se is no contra-indication to surgery The smallest baby surviving operation in this series weighed just over 2 lb

The details of the 75 cases are shown in table III It is impossible to give here a detailed account of the treatment for the different neonatal surgical conditions, but the more important malformations and other anomalies are briefly discussed below

Intra abdominal Lesions (23 cases)

These lesions comprise the largest group 23 cases (30 6% of the total) All the 9 babies who received no surgical treatment died, and of the 14 who were operated on 5 recovered In intestinal obstruction of the newborn the technical difficulties at operation, although formidable, are small compared with the difficulties encountered in preoperative and postoperative management The problems of intestinal decompression and control of the blood chemistry are little understood There is the constant danger of inhalation pneumonia due to aspiration of vomit This danger is increased by general anæsthesia, therefore the passing of an endotracheal tube and packing of the pharynx is always advisable (Rees 1950) Only 2 children in this series were operated on under local anæsthesia, and both died These cases of intra-abdominal abnormality were classified as follows

(1) *Duodenal Atresia* (5 cases) —One child was not operated on, of 2 who underwent gastrojejunostomy 1 survived, and of 2 who underwent duodenojejunostomy 1 survived This condition is perhaps the most common type of intestinal atresia in the newborn, it was described in detail by Ladd and Gross (1941) in America and by Forshall (1947) in this country Current American reports show that, given the best facilities, the mortality should be low (10% in the 10 cases of Grove and Rasmussen 1950)

(2) *Intrinsic Obstruction of Small Intestine* (3 cases) —All these babies died Side to side anastomosis was done in each case All these babies came too late for successful operation, and a considerable length of non viable gut had to be excised Other malformations were also present in each case Intrinsic obstruction of the small intestine distal to the duodenum is the most fatal of the gastro-intestinal malformations, but numerous recoveries have been published Ladd and Gross (1941) reported a mortality rate of 73%, and Glover and Barry (1950) one of 75%

(3) *Extrinsic Obstruction of Small Intestine* (7 cases) —Of 4 babies operated on only 1 recovered These results are very unsatisfactory because the prognosis in this condition distal to the duodenum is quite hopeful 75% of the patients reported by Glover and Barry (1950) survived

(4) *Neonatal Peritonitis* (5 cases) —This condition is seldom recorded, but cases have been published from time to time since Simpson's original paper (1838) No doubt this condition is much more common than has been suspected in the past Most cases are diagnosed as gastro-enteritis or septicæmia and, unless there is a necropsy, the true state of affairs may not be discovered Peritonitis can, of course, occur secondarily to gastro-enteritis, but in all the cases reported here the peritonitis was secondary to perforation of the intestine with or without mechanical intestinal obstruction Of the 5 Liverpool cases 4 were not diagnosed before necropsy One child was thought to have intestinal obstruction, was operated on, and recovered A considerable number of recoveries have been reported from America (Low et al 1949, Neuhauser 1944) No improvement can be expected in the present high mortality unless this condition is diagnosed earlier so that surgical treatment can be given speedily

(5) *Meconium Ileus* (1 case) —This is due to cystic fibrosis of the pancreas and has recently received much attention. There have been very few recoveries in this country, but in America several surgeons have reported a high survival rate, Hiatt operated on 8 cases and 5 survived (Hiatt and Wilson 1948) It is surprising that there was only 1 baby with meconium ileus in the Liverpool cases, he died after operation. In spite of a considerable amount of research, the pathology of this condition is not yet clearly understood, and further biochemical and pathological study will be needed before we can hope to lower the high mortality

(6) *Hirschsprung's Disease* (1 case) —This child had the long segment type of this condition and died soon after operation This variation of Hirschsprung's disease, which has only recently been recognised, has a very high mortality (Zuelzer and Wilson 1948, Bodian et al 1951, Forshall et al 1951) Swenson (1950), however, reports some recoveries in children on whom he did an ileostomy This condition i probably not uncommon Few reports have been published but surgeons will naturally be reluctant to report cases wit apparent neonatal intestinal obstruction where no mechanica block is found at operation Only serial microscopical section of the gut will clinch the diagnosis (Rickham 1950c)

(7) *Strangulated Hernia* (1 case) —This is rare in the neonata period The only case in the present series had all the sign of intestinal obstruction with gross distension and fæculen vomiting for three days, during which time the baby wa treated for "gastro enteritis" Recovery followed operatio

Œsophageal Atresia (8 cases)

It is now thought that œsophageal atresia is at leas as common as imperforate anus Of the 8 babies 6 wer operated on, and 2 of these survived There was a hig incidence of multiple deformities in this group (table IV including imperforate anus, agenesis of the lung, an Fallot's tetralogy This incidence of associated mal formations in 1949 was very high, and no simila incidence has been recorded before or after This, t some extent, explains the high mortality America surgeons report high recovery-rates, Swenson (1950 had 75 cases with only 18 postoperative deaths Ther have been several reports of success in this countr (Franklin 1947, Rickham 1950a, Belsey and Donniso 1950) All the 8 babies in this group had been fed sometimes repeatedly, before the condition was suspected This is lamentable because the danger of causing inhalatio bronchopneumonia by giving a feed is very great.

TABLE IV—MULTIPLE MALFORMATIONS IN 16 (22 7%) OF TH LIVERPOOL SERIES

2	Exomphalos and volvulus
1	,, and microcolon
1	,, and diaphragmatic hernia
1	Œsophageal atresia and anal atresia
1	,, ,, and Fallot's tetralogy
1	,, ,, and patent intraventricular septum
1	,, ,, and agenesis of one lung
1	,, ,, and acrocephaly-syndactyly
1	Imperforate anus and hypospadias
1	,, ,, and epispadias
1	,, ,, and hydronephrosis
1	Volvulus and duodenal atresia
1	,, and anal stricture
1	,, and micrognathia
1	Diaphragmatic hernia and Klippel Feil syndrome

Imperforate Anus (8 cases)

This is one of the most common gastro-intestina malformations There are two types

(1) *Low Rectal Atresia* (4 cases) —Of these 4 babies 2 had perineal fistula, called ectopic anus by Browne (1951a) an 1 a low rectovaginal fistula. All 4 recovered after operation but 1 died later of uræmia secondary to bladder neck obstruction It is commonly taught that the treatment of imperforate anus is a comparatively minor operation This is tru only for cases of low rectal atresia

(2) *High Rectal Atresia* (4 cases) —This is perhaps the mos difficult neonatal surgical problem Of the 4 babies with hig rectal atresia 3 underwent colostomy, and 1 of these died o intestinal obstruction In 1 case the approach was throug the perineum, this child survived, but the final result wa unsatisfactory Permanent colostomies in newborn babie are undesirable, and it is hoped that a better method o treating these unfortunate children will be found It remain to be seen whether the recent technique of a "pull through" operation will solve the problem. Although the operative mortality rate should be under 10%—Mayo and Rice (1950) report 165 cases with 15 deaths—the final results in this condition are at present far from satisfactory

Exomphalos (7 cases)

Of the 7 babies with exomphalos 6 died. This very high mortality is disturbing, but it must be added that 4 babies had severe associated abnormalities 2 had an associated volvulus of the small intestine; 1 had an undiagnosed diaphragmatic hernia; and 1 died after operation from intestinal obstruction due to a microcolon of unknown origin (? Hirschsprung's disease) These results leave much to be desired Ladd and Gross (1941) had a 75% postoperative survival rate from exomphalos of less than 8 cm in diameter, and Gross (1948) and Gross and Clatworthy (1950) have shown that with improved technique, babies with exomphalos over 9 cm in diameter may be saved

Obstructive Jaundice (6 cases)

Jaundice due to congenital obstruction of the bile passages was observed at birth in 1 case and on the 2nd 4th 6th, 14th and 10th day in the others Laparotomy was performed on 5 babies but was successful in only 1 the other 4 babies died before the age of six months Unfortunately in many of these cases the obstruction is intrahepatic, a condition not amenable to surgery at present. However the recent development of the operation of intrahepatic cholangiojejunostomy by Longmire and Sanford (1948, 1949) has made the outlook more hopeful It is not generally realised that, once the condition has been diagnosed the baby should be operated on without delay, because continued obstruction leads to hepatic cirrhosis Ladd and Gross (1941) had 45 cases in only 9 was operative repair possible, and 6 of these babies survived; and in 6 further cases the block was due to inspissated mucus and 5 of these babies survived

Diaphragmatic Hernia (4 cases)

Diaphragmatic hernia and eventration are comparatively common malformations, but the condition is not usually severe enough to endanger life shortly after birth Of these 4 babies 2 were operated on and 1 of them survived; the 3 others died Numerous reports have been published in America (Ladd 1940) of successful operations on newborn infants with this condition

Spina Bifida (7 cases)

Browne (1949) has stated that operation for meningocele or myelomeningocele is seldom justifiable in the neonatal period The figures in this report tend to confirm this view 7 babies with spina bifida were operated on shortly after birth and are therefore included in this survey In 2 cases the operation was undertaken because the sac had ruptured The results were not encouraging there were 4 postoperative deaths (1 due to shock, 1 to paralytic ileus, and 2 to meningitis) and of the 3 babies who survived 2 developed hydrocephalus soon after operation These figures support Norman's (1949) emphatic advice against operation during the first twelve months of life Some American surgeons however notably Ingraham and Bailey (1946) Campbell (1948) and Kredel (1950) seem to have had successes in the neonatal period

Genito urinary Lesions (2 cases)

Certain genito urinary malformations sometimes give rise to urgent symptoms in the neonatal period (bladder neck obstruction hydronephrosis pyonephrosis, &c) and the mortality rate is high. In the Liverpool series there was 1 child with bladder neck obstruction and 1 with pyonephrosis; both were diagnosed at necropsy It is my impression that gross urinary malformations are not uncommon, but are seldom recognised during life. Reports from America (Campbell 1938 1941 Gross and Clatworthy 1950) show that many of these babies can be saved

Suppurative Parotitis (2 cases)

This condition is not rare in the neonatal period Unless it is promptly diagnosed and treated by chemotherapy and surgery there is great danger of septicæmia 1 of the babies died of this condition Sanford and Shmigelsky (1945) in America, have reported very successful results.

Miscellaneous Conditions (8 cases)

Only two conditions grouped under this heading are discussed here

(1) *Micrognathia* (3 cases) —Severe degrees of micrognathia associated with cleft palate are usually fatal Death is due either to suffocation resulting from difficulty in sucking or to aspiration pneumonia. Of the 3 babies 2 were treated medically and died, and 1 was operated on to keep the tongue and mandible forward and survived Much work relating to emergency operations for this condition has been done in America, and successes are reported by Douglas (1946) and Longmire and Sanford (1948 1949)

(2) *Lax Œsophagus* (1 case) —Although there was only one case in 1949 our experience since 1949 with careful radioscopy of infants with vomiting of obscure cause has convinced us that this condition is not at all uncommon. The pathology and symptoms of lax œsophagus and the allied condition of short œsophagus are not yet fully understood and it is too early to discuss the rôle of surgery in treating this condition during the neonatal period Very good results with early surgery have been reported by Thomsen and Wamberg (1950) and others.

DIAGNOSIS

If the mortality rate due to congenital malformations is to be lowered correct early diagnosis is of the utmost importance for the mortality rate in urgent neonatal surgical conditions like œsophageal atresia and intestinal obstruction rises in direct ratio to the delay in operating Table v shows quite clearly that the mortality rate in both series rises steeply with every day of age of the baby and that if the delay is more than three days, the mortality rate approaches 100% Table vi shows the presenting signs encountered in this investigation

TABLE V—AGE-INCIDENCE AT OPERATION ON URGENT CASES ONLY

Age (hr)	Liverpool		Great Ormond Street	
	No of cases	No of deaths	No of cases	No of deaths
24 or less	14	7 (50%)	11	4 (36%)
24–48	6	5 (83%)	7	4 (57%)
48–72	5	4 (80%)	8	6 (75%)
72–96	2	2 (100%)	2	2 (100%)
96–120	3	2 (67%)	2	2 (100%)
120–144	1	1 (100%)	1	1 (100%)
Over 144	2	2 (100%)	3	3 (100%)
Total	33		34	

Visible Deformities

Of the 75 babies 28 presented with a visible deformity Apart from obvious deformities—e.g exomphalos micrognathia, and spina bifida—there are conditions in which routine inspection should reveal the abnormality Imperforate anus is not infrequently overlooked for one or two days and there was a typical strangulated inguinal hernia which was not recognised until the baby had been vomiting for three days

Vomiting

Vomiting may occur either as a symptom of disease or deformity or more commonly in association with some difficulty in feeding It is often the result of unwise

TABLE VI—PRESENTING SIGNS

Sign	Liverpool	Great Ormond Street
Visible deformity	28 (37.3%)	19 (31.7%)
Vomiting and distension	13 (17.3%)	12 (20.0%)
Vomiting and peristalsis	4 (5.3%)	1 (1.7%)
Vomiting only	6 (8.0%)	1 (1.7%)
Distension only	1 (1.3%)	2 (3.3%)
Distension and constipation	1 (1.3%)	6 (10.0%)
Distension and urinary retention		1 (1.7%)
Cyanosis and dyspnœa	6 (8.0%)	3 (5.0%)
Spluttering of mucus	8 (10.7%)	8 (13.3%)
Jaundice	7 (9.3%)	7 (11.7%)
Convulsions	1 (1.3%)	

efforts to force food on a newborn infant or of overfeeding or too rapid feeding

Vomiting is a common manifestation of head injury due to birth trauma and occurs fairly constantly in the early stages of infections—e g , coryza, pneumonia, pyelitis, and septicæmia—and especially in medical diseases of the gastro-intestinal tract It was noted in 23 of the 75 babies Usually the higher the lesion the earlier the vomiting In œsophageal atresia the food will be returned immediately and swallowing will be accompanied by spluttering, coughing, and cyanosis As already stated, these cases should not be diagnosed by the events resulting from offering a feed In the grosser types of diaphragmatic hernia vomiting is usual but is overshadowed by signs of respiratory embarrassment

Vomiting occurs in duodenal obstruction within the first forty-eight hours of life and is usually projectile In 4 out of 5 cases the vomitus will contain bile—i e , the obstruction is distal to the bile papilla Even if these children are not fed, they will vomit bile in large amounts

In small-bowel obstruction—e.g , atresia and volvulus —vomiting is usually the presenting symptom The earlier vomit may consist of milk only, but soon the vomit will contain bile and later it will be fæculent

Vomiting comes on later in cases of large bowel obstruction and of imperforate anus but becomes persistent It is an important symptom in peritonitis and intraperitoneal hæmorrhage

In all the conditions described above the vomit may be stained with blood

It is surprising how often these babies inhale their vomit and die of asphyxia or aspiration pneumonia without any previous recorded history of vomiting It is quite likely that some of the many neonatal deaths reported as being due to asphyxia would have shown at necropsy an underlying surgical condition

Abdominal Distension

Distension is the second most common symptom in babies with surgical lesions of the gastro intestinal tract, but it must not be forgotten that medical conditions—e g , mismanagement of feeding, and gastro enteritis—give rise to considerable abdominal distension In 15 of the cases distension was a presenting sign

Distension is slight in duodenal obstructions and then occurs only in the epigastric region , it is often overlooked The lower the lesion in the intestinal tract the greater is the distension In lesions of the lower ileum, large bowel, and anus it may be extreme the skin becomes stretched and shiny, and the abdomen appears to be in imminent danger of bursting In babies abdominal distension due to intestinal obstruction develops much more rapidly than in adults and soon interferes with respiration The breathing becomes rapid and shallow and there is dyspnœa, sometimes with cyanosis

Visible Peristalsis

Peristalsis was observed in 4 cases In duodenal atresia typical epigastric peristalsis may be seen, as in pyloric stenosis Intestinal peristalsis was not often noted in the present series, which is surprising, because the abdominal wall in these babies is thin and the abdominal musculature poorly developed Possibly the rapidly developing distension soon causes paralysis of the intestinal muscles.

Constipation

Absolute constipation is very uncommon as a presenting sign, except of course in anal atresia Even in low intestinal obstructions it is common for one or more small meconium stools to be passed , and, unless this fact is realised, there may be fatal delay in diagnosis Staining the meconium for epithelial cells and lanugo hairs—Farber's (1933) test—may be a useful laboratory aid to the diagnosis In Hirschsprung's disease, especially if it is of the long segment type, constipation exists from birth, small hard stools being passed The 1 case of distension and constipation in the present series was an example of Hirschsprung's disease

Spluttering and Regurgitation of Mucus

It is important to impress on all those dealing with newborn infants that the baby whose mouth keeps filling with mucus and saliva, even after the air passages have been properly cleared with a mucus catheter, must be considered to have an œsophagotracheal fistula until the diagnosis has been disproved by the passage of a catheter into the stomach There may or may not be attacks of cyanosis If a catheter will not pass into the stomach, the infant should be assumed to have œsophageal atresia, and be forthwith transferred to a centre fo operation This symptom complex was present in all 8 cases of œsophagotracheal fistula in the present series.

Cyanosis

When persistent or present from birth, cyanosis is likely to be due to atelectasis, congenital heart lesion, or head injury It is also an important sign of certain surgical lesions In œsophageal atresia secretion accumulates in the pharynx and blind œsophageal pouch and overflows into the air-passages Cyanosis is aggravated by trying to feed the baby In these cases cyanosi can be reduced by keeping the pharynx clear of muc by repeated aspiration Cyanosis is seen in cases of lar diaphragmatic hernia or extensive diaphragmatic ev tration in which the lung tissue is compressed by abdominal contents displaced into the chest. I increased when the infant cries or is fed

As already mentioned, cyanosis may be the only outward sign when a child aspirates its vomit

Surprisingly, in the present series there were only 8 cases in which cyanosis was noticed before any other sign

Jaundice

Jaundice is the main sign of obstruction of the bile passages, and all 7 babies suffering from this condition showed it to a marked degree It is classically accompanied by the passage of clay coloured stools and dark brown urine, but sometimes the stools in congenital atresi of the bile ducts are yellowish The liver is usually mu enlarged and firm Rarely is it possible to palpate t gall bladder Even with modern laboratory methods is notoriously difficult to distinguish these cases from jaundice due to sepsis, congenital syphilis, icterus gravis, hepatitis and cirrhosis, and, in the first days of life, physiological jaundice

Urinary Retention

Retention of urine is an uncommon symptom in th newborn, but it must be realised that the normal newborn often retains urine for one or two days Th apparent anuria has at times frightened medical attendants into passing a catheter, with unfortunate consequences, since the very sensitive urethral mucosa of these babies is intolerant of irritation, and the resulting acute retention of urine due to œdema of the urethr mucosa is difficult to treat

CAUSE OF DEATH

Intestinal obstruction (with or without peritonitis) and respiratory infection (with or without atelectasis) were the two commonest causes of death Shock or heart failure may occur in the postoperative period The danger of meningitis following operations for spina bifida is well known Hepatic cirrhosis was responsible for the deaths of 4 babies with obstructive jaundice Uræmia as a cause of death secondary to malformation or infection of the urinary tract is comparatively uncommon,

TABLE VII—CAUSES OF DEATH

Cause of death	Liverpool	Great Ormond Street
Shock and heart-failure	9 (16 6%)	5 (17 %)
Peritonitis	7 (12 9%)	4 (13 7%)
Intestinal obstruction	5 (9·3%)	1 (3 4%)
Volvulus	3 (5 5%)	1 (3 4%)
Cirrhosis	4 (7 4%)	3 (10 3%)
Pneumonia	6 (11 1%)	6 (20 6%)
Empyema and Mediastinitis	1 (1·8%)	3 (10·3%)
Meningitis	4 (7 4%)	1 (3 4%)
Pyonephrosis	1 (1·8%)	2 (6 9%)
Hydronephrosis	1 (1 8%)	1 (3 4%)
Atelectasis	5 (9·3%)	
Uræmia	1 (1·8%)	
Paralytic ileus	1 (1 8%)	
Curare poisoning	1 (1 8%)	
Over-transfusion	1 (1·8%)	
Gastro-enteritis	3 (5 5%)	
Liver abscess		1 (3 4%)
Anasarca		1 (3 4%)
Unknown	1 (1 8%)	

but perhaps it is sometimes overlooked because it is not easily recognised. Secondary gastro-enteritis was unexpectedly infrequent among the babies in the present series, only 3 of them dying of it (table VII)

COMPARABLE DATA FROM THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

No similar survey made on an area or population basis has been published; so there are no strictly comparable data. I have therefore summarised for comparison the main details of 60 newborn infants admitted to the Hospital for Sick Children, Great Ormond Street, in 1949 for surgical treatment. The numbers in the two groups are not grossly dissimilar and it will be seen that, after division of the cases into different pathological categories, the resemblance between the two groups is borne out. However the Liverpool group contains all the cases in which a surgical lesion was proved even if they were not transferred to hospital, whereas the Great Ormond Street group is to some extent selected, in that the babies must all have been thought suitable for transfer from their place of birth It is not surprising that the survival rate is much higher in the Great Ormond Street series, since this is a highly specialised hospital, whereas in Liverpool the children were operated on in various hospitals, some of them not ideally equipped for this type of surgery

TABLE VIII—SEASONAL INCIDENCE

Month	Liverpool	Great Ormond Street
January	7	1
February	1	4
March	4	6
April	5	8
May	6	4
June	8	7
July	7	2
August	7	6
September	5	7
October	10	8
November	6	5
December	9	4

Of the 60 babies admitted to Great Ormond Street 29 (48 3%) died (table II) In comparison with Liverpool, it is very striking that only 2 children were not treated surgically and both died 58 were operated on with a mortality of 46 5% In both series there is a preponderance of boys, but the proportion of premature babies is much smaller in Great Ormond Street (16 6% of the total, against 41 3%) Table III shows that the different types of lesions are comparable in the two groups, and table VI that the presenting signs and symptoms are also similar

As regards the mortality at Great Ormond Street there were no deaths due to secondary gastro-enteritis This is a fine achievement

ÆTIOLOGY

A great deal has been written in the last thirty years about the ætiology of congenital malformations; yet we still know little about the causal factors Except for some very rare malformations—e.g brachydactyly and achondroplasia—due to dominant genes, and some types of microcephalic idiocy due to recessive genes, very few malformations can be said to be determined solely on a genetic basis. The epoch making work of Gregg (1941) and Swan (Swan et al 1943, Swan and Tostevin 1946) drew attention to maternal rubella as a cause of congenital malformations. Toxoplasmosis is another infection in which some of the offspring may have deformities (Sabin 1942) However the incidence of these infections in pregnant women is very low and accounts for only a minute proportion of all congenital malformations

I cannot here discuss the ætiology in any detail but a few observations may not be out of place.

Seasonal Incidence of Congenital Malformations

McKeown and Record (1951) found a significantly higher incidence of anencephaly in children born between October and March. There was no evidence of seasonal variation in the incidence of spina bifida or of hydrocephalus

TABLE IX—MATERNAL AGE

Age of mother at maternity (yr)	England and Wales	Liverpool	Expected figures
Less than 20	31 753	3	3 3
20–24	200 406	22	20·6
25–29	244 607	22	25 2
30–34	136 707	15	14 1
35–39	87,398	13	9·0
40 or more	27 636		2 8

Neither Murphy (1947) nor Carter (1950) could find any significant seasonal incidence In the Liverpool and Great Ormond Street series table VIII shows no significant season variation

Maternal Age

It is well known that the incidence of mongolism increases with the age of the mother and possibly of the father and several surveys have been published which seem to prove that children with congenital malformations are more commonly born to older mothers (Murphy 1947 Malpas 1937 Landtman 1948) Carter (1950), however showed that the association of maternal age with malformations in the offspring became insignificant if mongolism was excluded The maternal ages in the Liverpool series are shown in table IX and compared with the number of mothers in all age groups who were delivered of a live child as reported by the registrar for births and deaths there appears to be no significant increase in the incidence of babies with 'surgical" malformations born to the older mothers

Birth Order

It has often been stated that there is a raised incidence of certain malformations both in first pregnancies and in pregnancies after the fifth or sixth (Baird 1945 Murphy 1947) Carter (1950) failed to confirm this observation The birth orders of the children with congenital malformations in the Liverpool region compared with those

TABLE X—BIRTH ORDER OF LEGITIMATE CHILDREN

Birth order of child	England and Wales	Liverpool	Expected figures
1	278,074	36	[illegible]0·9
2	222 765	17	24·0
3	10[illegible] 048	8	11·0
4	41 418	8	4 8
5	21,363	2	2 3
6	11,003	3	1 3
7	6910	1	0 7
8 or more	10 846		1 2

of the country as a whole can be seen in table x There seems to be no statistically significant association between the incidence of surgical malformations and the birth order of the children

Previous Obstetric History

Murphy suggested that malformations were liable to occur in pregnancies following previous *abortions*, and this has been the impression of many clinicians working in this field In the Liverpool survey 3 mothers gave a history of previous miscarriages One of them had two successive miscarriages before the birth of the affected child.

Murphy (1947) found a definite tendency for *malformations* to recur in some families However, Malpas (1937) and Carter (1950) state that the chances of a mother giving birth to a malformed child are not greatly increased when she has previously given birth to one Individual deformities—e g , malformations of the central nervous system, cleft palate and hare-lip—are known to recur in some families (Penrose 1946, Fogh-Andersen 1943) In the present Liverpool series 3 babies had a family history of congenital malformations (1) the elder brother of a baby with malrotation of the midgut had died at the age of 3 months of a similar abnormality ; (2) a baby with a strikingly underdeveloped mandible had a father with severe micrognathia and (3) the elder sister of a girl dying with myelocele had died at the age of 16 months of a similar complaint

Maternal Morbidity

Besides rubella and toxoplasmosis, certain other diseases of the mother are known to be associated with malformations in the offspring , but in any series of congenital malformations the mother's history seldom reveals any infectious illness during pregnancy (Capon 1950) Diabetes mellitus is a good example (White 1935), and certain virus infections in addition to rubella—e g , mumps, varicella, herpes zoster, influenza, poliomyelitis, and infective mononucleosis—have recently come under suspicion (Swan and Tostevin 1946) The rôle of toxins in producing congenital malformations has received renewed attention as a result of the brilliant work of Duraiswami (1950) on insulin-induced malformations in the chick. There is a raised incidence of deformity in children born of mothers who have had toxæmia of pregnancy (Ministry of Health 1949)

Of the 75 Liverpool mothers of the children under discussion 3 had had no antenatal supervision , so no adequate records are available Of the remaining 72, 19 (26%) had had some disease during pregnancy 6 toxæmia, 5 severe hydramnios, 2 pyelitis, 2 hypertension, 2 antepartum hæmorrhage, 1 fibroids, and 1 epilepsy None of the mothers gave a history of virus infection during pregnancy

The high incidence of hydramnios is of interest in view of the theory that environmental changes in utero may play a part in the causation of malformations This theory was first suggested by Mall (1908) and has been greatly developed by Browne (1951b) during the last fifteen years

Since the pioneer work of von Hippel and Pagenstecher (1907) it has been recognised that deep X-ray therapy of the mother may cause malformations in the offspring None of these mothers had had X ray therapy before or during pregnancy

Diet and Social Status

Neonatal mortality can be influenced by the diet of women during pregnancy (Balfour 1944, Townsend and Reese 1944) The work of Hale (1933) and of Warkany and others (Warkany 1943, Warkany et al 1948) has shown that in certain animals vitamin deficiency in the mother can cause malformation in the offspring In man it is obvious that diet and social status are closely related From his extensive study of infant mortality in the country boroughs of England and Wales Woolf (1947) concluded that poverty and overcrowding are of about equal importance in infant mortality I therefore tried to assess the diet and social status of the mothers in the present survey though I recognised that in these days of rationing and social equalisation the importance of these factors is unlikely to be very great

Of the 75 mothers 4 were decidedly poor, and 3 of these had a grossly inadequate diet during pregnancy The homes of 10 mothers were reported to be bad 15 women did some work apart from household duties during pregnancy 7 did light work for two to four months, 7 for four to seven months, and 1 did heavy manual work for seven months

CONCLUSIONS

The surgery of the newborn is perhaps the most neglected branch of surgery In this country centres for neonatal surgery are practically unknown, and little effort has been made to develop this important subject In the United States under the leadership of Professor Ladd and Professor Gross, pædiatric surgery in general, and the surgery of the newborn in particular, has made spectacular progress during the last fifteen years Indeed, it can be said that in no other branch of surgery, with the possible exception of thoracic surgery, has progress been so striking Unfortunately we in Great Britain have failed to keep in step with these new developments

If in this country we are to improve the chances of survival of children born with congenital malformations, an efficient neonatal surgical service must be organised As the National Health Service has divided the country into administrative self supporting regions, neonatal surgical centres should be developed on a regional basis. The total number of cases suitable for treatment is relatively small and in the ordinary way a surgeon is unlikely to see more than one or two cases a year, from which he can hardly gather enough experience to deal correctly with these complicated surgical problems. In an area the size of the Liverpool region there is enough material to justify the establishment of a centre for neonatal surgery The costs would be small compared with those of other special surgical centres.

This branch of surgery is still in its experimental stage and surgeons who want to devote themselves to it will have to spend much time in investigating and treating these babies We know, as yet, very little about the anatomy, physiology, and embryology of malformations we know even less about the pathological and biochemical changes in newborn infants undergoing lengthy and severe operations Without the close coöperation of surgeons, pædiatricians, pathologists, and anæsthetists experienced in this type of work no hope of progress can be entertained , and the recovery of these children will also depend largely on the quality of the nursing The nurses will need very special instruction and training Constant and devoted supervision is absolutely necessary if sudden preoperative and postoperative deaths are to be avoided

From these considerations it is clear that the neonatal surgical centre should, if possible, be attached to a large children's hospital In an area the size of the Liverpool region the centre should ideally be housed in a separate small ward with cubicles for about 6–8 cots and with accommodation for nursing mothers Newborn infants should not be nursed in wards which admit older children, because the danger of cross infection is great Special equipment—e g , specially constructed cots, oxygen tents or boxes, and low-pressure suction machines—is essential, but the cost is not likely to be high A fully trained qualified sister or nurse should be at hand, day and night.

It would be futile to establish such a centre without ensuring prompt diagnosis and transfer of these children Fortunately, in Liverpool most of the larger hospitals in the peripheral areas of the region enjoy the services of local pædiatricians who maintain close contact with the university department of child health and we thus have the basis on which a unit could be established. It would be *important to draw the attention of the general practitioners*, obstetric house-officers, and midwives to the significance of the early clinical signs of these conditions.

Finally a word about the qualifications and training of surgeons undertaking this sort of work I can do no better than to quote Professor Ladd:

> 'The common practice in children's hospitals of having the pædiatrician make the surgical diagnosis, running the preoperative and postoperative care and calling a surgical consultant for the operation only is not a good one This policy makes of the so-called surgeon only a surgical technician or craftsman, and the patient necessarily suffers'

Discussing neonatal surgery Professor Ladd said:

> "The surgeon who undertakes these operations should be familiar with the factors of early development of the infant of his feeding requirements of possible blood dyscrasias of the details of electrolyte and water balance requirements

SUMMARY

An attempt is made to examine some of the causes of high mortality rate in neonatal surgery in this untry The magnitude and nature of the problem so as it affects the Liverpool region has been investigated

All neonatal surgical cases admitted to the Hospital Sick Children Great Ormond Street, in 1949 have en surveyed to provide some sort of comparative ures.

The clinical manifestations, causes of death and aims treatment have been described in some detail and ne of the ætiological factors have been statistically restigated

The development of neonatal surgical centres on a gional basis is advocated

I wish to thank Prof N B Capon and Miss I Forshall for eir great help and encouragement in preparing this paper r Denis Browne and Dr R M Todd have kindly given e advice and criticism, and Mr R L. Plackett, of the partment of applied mathematics in the University of verpool has assisted me in statistical matters. I am indebted the pædiatricians, surgeons, and hospital superintendents the Liverpool region, and the medical board of the Hospital r Sick Children, Great Ormond Street, for permission to spect their records, and to the medical officers of health of e county and boroughs within the Liverpool region, especially r R E Bell, senior assistant medical officer of health for verpool for the valuable material they placed at my sposal. This work was done with the aid of a grant from e United Liverpool Hospitals Endowment Fund

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INFECTIVE HEPATITIS IN A BOARDING-SCHOOL

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PHYSICIAN HASTINGS GROUP OF HOSPITALS

The many reports in recent years on outbreaks of infective hepatitis have mostly described its incidence among troops during and after the late war As Paul and Gardner (1950) point out outbreaks among civilians have been less often reported. In particular there are few accounts of epidemics in closed communities, with personal study of cases as they occurred Most of the descriptions of civilian epidemics relate to whole districts or towns, and the investigation has sometimes been made, *after the epidemic, by an outside observer* Four papers on hepatitis in closed communities are the following

Glover and Wilson (1931) describe an epidemic in three boarding schools in which 95 boys were affected (24%)

McLeod (1944) describes 100 cases in a colony for mental defectives, with the highest age incidence between 10 and 14 (34%) The lowest-grade imbeciles were more frequently affected.

Neefe and Stokes (1945) describe 350 cases out of 572 at risk, developing in thirteen weeks from the contaminated water supply of a camp

Horstmann, Havens, and Deutsch (1947) give accounts of epidemics in two children's institutions emphasising the frequency but also the mildness, of the disease in children.

The present outbreak occurred between October 1950 and January 1951 in a boys preparatory school Apart from one outing with parents by the boys, and journeys to the town (where hepatitis was not prevalent) by the staff the community can be regarded as closed throughout the term (Sept 19 to Dec. 13) The personnel can be grouped into (A) 69 boys aged 6–13 (B) 12 adult teaching and nursing staff and (C) 9 adult domestic staff Of these 90 50 developed symptoms definitely or strongly suggestive of hepatitis, and so did

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3 others who came into later contact with the original group Of the 50, 44 were boys (group A) (63 8%) and 6 adults (group B) (50%) None of group C were known to be infected The incidence bore no obvious relation to contact in dormitories, classrooms, or elsewhere All cases were seen by me except nos 42–45, 47–49, and 53, in which the illness started during the holidays All parents had been asked to report any suspicious symptoms in the boys, or their home contacts

DISCUSSION

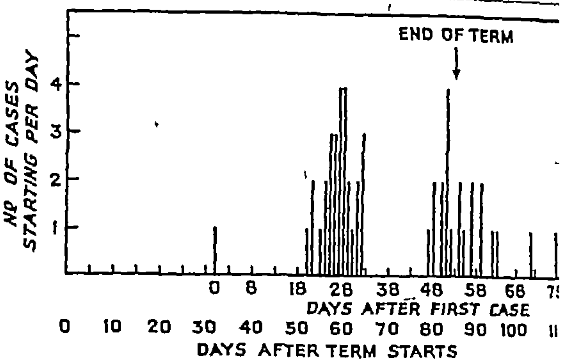
Symptoms and Signs

Apart from the symptoms listed in table I, nearly every case started with one or more of the following nausea, vomiting, severe anorexia, pain behind the eyes, giddiness, slight fever, or merely a typical slightly greyish pallor As the epidemic progressed, the nurses began to spot the mildest cases by this pallor alone, and other confirmatory symptoms often followed The passage of dark urine was observed, for a short period only, in some cases (cf Franklin's case quoted by Cullinan 1939). Many cases—especially early in the epidemic—were so mild that, had an epidemic not been in progress, they would certainly have been missed

TABLE I—SUMMARY OF THE CASES

Case no	Age	Onset of symptoms (days after onset in case 1)	Clinical findings		
			Jaundice	Liver enlarged	Pale stools observed
1	8	0	Yes	Yes	Yes
2	8	20	No	No	No
		29*	Slight	Yes	Yes
3	10	21	No	No	No
		27*	No	No	No
4	11	21	Marked	Marked	Yes
5	25	23	Yes	Yes	Yes
6	12	24	No	Yes	Yes
7	6	24	No	No	No
8	13	25	No	No	No
9	13	25	No	No	No
10	11	25	Slight	Slight	Yes
11	10	26	No	No	No
12	13	26	No	No	No
13	12	26	No	No	Slight
14	11	27	No	No	No
15	9	27	No	No	No
16	11	27	No	No	No
17	19	27	No	Slight	Yes
18	9	28	No	No	No
19	9	28	No	No	Yes
20	13	28	No	No	No
21	12	28	No	No	No
		60*	Yes	Yes	?
		114*	No	Marked	No
22	8	29	Slight	Yes	Slight
23	8	29	Slight	Yes	Yes
24	8	30	No	No	No
25	9	31	Marked	Marked	Yes
26	10	31	No	Yes	Yes
27	11	32	Yes	Yes	Yes
28	11	32	No	No	No
29	9	32	No	No	Slight
30	10	47	Marked	Marked	Yes
31	9	48	Slight	No	No
32	±40	48	Yes	Yes	Yes
33	11	50	No	No	No
34	9	50	No	No	Slight
		61*	Yes	Yes	Slight
35	9	51	Marked	Marked	Marked
36	9	51	No	No	No
37	11	51	No	Slight	No
38	8	51	Slight	Yes	Slight
39	8	52	No	No	No
40	11	54	Yes	Yes	Yes
41	25	54	No	No	No
		73*	Yes	Slight	Slight
42	12	55	Slight	No	No
43	12	57 63* 67*	?	No	No
44	8	57	Yes	?	?
45	11	59	Yes	Marked	Yes
46	±40	59	Marked	Marked	Marked
47	10	62	No	No	No
48	11	63	? (" urine dark ")	?	?
49	±30	72	Slight (" bilirubin raised ")	?	Slight
50	9	79	Yes	Yes	Slight
51	19	66 (19–25 after contact)	Very slight	No	No
52	15	90 (26 after contact)	Very slight	No	No
53	19	96 (25–30 after contact)	Yes	?	?

* Recurrence of symptoms after apparent recovery



In 2 such cases (nos 51 and 52), as the patient was due to return to other institutions, it was imperativ to make a diagnosis, and this was confirmed by blood bilirubin levels of 4 0 and 2 8 mg per 100 ml respectively Both had positive colloidal-gold liver function tests. I have no doubt that similar figures could have been obtained in other mild cases The histamine test, studied by Brodribb and Cullinan (1936), was not performed as a routine, because it was considered too painful for these small boys It was tried on one or two convalescents to observe the recovery of their jaundice In these cases the weal was produced with a stinging nettle, on the forearm, rather than with intradermal histamine.

During the subsequent term, some cases of gastro enteritis occurred Their distribution seemed quite unrelated to the hepatitis, but those who were victims of both were all agreed that the gastro enteritis produced shorter and sharper symptoms, with a more definite termination, and no recurrence

Form of Epidemic

The figure illustrates the form of the epidemic It is generally recognised that the disease is most prevalent in autumn and early winter It is also certain that 5–15 is the most susceptible age group (Ford 1943, McLeod 1944, Horstmann et al 1947, Naughton et al 1950, and *Lancet* editorial 1950) Davis and Hanlon (1946) describe an epidemic in which exposed persons were affected as shown in table II

In the present outbreak the equivalent figure for the similar age groups together is 63 8% Cases developed in batches at intervals, as noticed by Pickles (1930), Cullinan (1939), McLeod (1944), and Naughton et al (1950), and covered about 3 months, as described in Army units by Gauld (1946) As will be seen from table I, there were few severe cases, and these were mainly in the third wave

Incubation Period and Infectivity

It is important to differentiate between the time of onset of early symptoms and the time of onset of jaundice. The former standard has been adopted here Pickles (1930) established the usual incubation period as 20–35 days, and this has been confirmed many times (Findlay et al 1931, Cullinan 1939, *Lancet* editorial 1950, and Naughton et al 1950) The peak period is about 27 days (Pickles 1930, Newman 1942, Kunkel and Hoagland 1947)

Case 1 developed 32 days after return to school from a town in which hepatitis was prevalent this boy had not eaten outside his home, except on the train, and he had had no known contact with other cases The second wave consisted of 28 cases between the 20th and 32nd days from the onset in case 1, the greatest number developing between the 26th and 28th days The third wave started 27 days after the beginning of the second, and lasted 16 days. The fourth wave started 25 days after the beginning of the third wave.

Case 51 came home on leave He lived and fed out, and saw only his parents. He was at home for 7 days, and his mother became ill on the day after he left (case 32) His contact with her was 19–25 days before he developed symptoms.

Case 52 developed mild hepatitis 26 days after feeding with case 46 who was ill at the time.

Case 53 a sister of one of the boys became ill 25 days after he had apparently recovered. He had had suggestive symptoms for 14 days previously and had been in contact with her throughout this time.

Case 32 must have been infectious before the onset of *any* symptoms, confirming Cullinan's (1939 1943) suggestions. Cullinan holds *that infectivity does not persist after jaundice* is established, but Meenan (1951) recently reported a case in which the disease was apparently transmitted by a kiss 13 days after the onset of symptoms.

Treatment

The treatment consisted in rest in bed (apart from going to toilet) saline purgatives, and a low fat high carbohydrate diet. In the worst cases the diet was fat-free, and in all cases cooked fats were reintroduced only gradually The mildest of cases, with exceptions to be described below were left in bed for 7 days, and the more serious until the symptoms and signs had disappeared Hard exercise was forbidden for some weeks after this. Most of the boys were feeling so well that the rigid standards adopted by Swift et al (1950) would have been quite impracticable.

TABLE II—INCIDENCE OF HEPATITIS IN TWO AGE-GROUPS (DAVIS AND HANLON 1946)

Age-group	Proved hepatitis	All minor gastric disturbances included
5–9	37·7%	56·6%
10–14	49·2%	63·5%

Relapses

The relapses can be divided into (1) a quick recurrence of symptoms during an attack and (2) a further attack, after a longer interval, due to liver damage or a fresh infection. Pickles (1930) describes a very severe case developing after hard exercise taken after the initial symptoms had appeared. Naughton et al. (1950) describe relapses of the first type among school-children. Findlay et al (1931) noted the tendency to relapse at intervals of 1 or 2 months Examples of both types were seen in this outbreak

Cases 2 and 3 complained of mild gastric symptoms and were left in bed for 2 or 3 days only It was not realised then, that they had hepatitis. Within a few days the symptoms returned, much worse than before and case 3 developed a large liver jaundice and pale stools. Thereafter all cases of gastric upset, however mild were put to bed for 7 days.

Case 21 had mild symptoms, similar to the others, starting on the 28th day On the 60th day at home, he had a recurrence and was much more severely ill. On the 114th day in the subsequent term, he became pale went off his food and again had enlargement of the liver lasting 1 week. The blood bilirubin was normal at this time but the colloidal gold test was 4+ I have no doubt that this was a late mild relapse of the type described by Dickson (1945) occurring in Army convalescent homes. The treatment was 1 week in bed after which all symptoms and signs had disappeared.

Case 31 was treated on the usual lines. As the stools were pale he was not allowed up but on the 11th day he suddenly developed a large liver jaundice and fever This was the only case after the routine period of rest was imposed, in which there was a quick relapse

Case 42 developed headache vomiting and fever at home He was allowed up after 5 days and the symptoms recurred. He was allowed up again after 2 days, and after he had been about for 2 days they recurred again

Case 41 felt "cold and off colour" and had pallor and anorexia. He went home but kept about for a week or so He soon returned to full activity but 10 days later developed epigastric pain and subsequent jaundice

Case 46 lived alone in the holidays, and, though the symptoms were obvious he continued to get about Within a week he was deeply jaundiced, and he was ill for a longer time and more severely than any of the other patients.

These cases strongly suggest that any patient who develops gastric symptoms after contact with infective hepatitis should be put to bed immediately, and kept there for at least a week This is an essential precaution if one is to prevent relapses and minimise liver damage.

Severity

As table I shows, only 7 boys out of 44 had anything more than the mildest attack One of these (no 21) was worse during a relapse; only nos 4 25 and 35 could be described as moderately severe No 25 had a palpable liver and a blood bilirubin of 2·2 mg per 100 ml. nearly 3 months after the onset, but he had then been free of symptoms for 2 months After a further week in bed the bilirubin level was less than 1 mg In contrast, the 6 adults were more severely ill, and in the 3 oldest victims malaise and depression persisted for a considerable time.

Mode of Spread

The *most striking feature of the outbreak was the* absence of any cases in the domestic staff (group C) Many of them were young and presumably very liable *to the infection They certainly had contact with the* boys, but not such close contact as group B They fed on the same food but they ate separately and used their own feeding utensils. Groups A and B fed together sharing another set of cups and cutlery, which were washed separately Only their large plates were washed with those of group C

This has a parallel in the much greater tendency of officers to develop the disease, compared to other ranks as shown by Cullinan (1943) Spooner (1944) and Truelove (1945) A possible explanation was that immunity had been acquired in those of lower social status, and this would equally apply to group C A more attractive theory, discussed by Witts (1944) and McFarlan (1945), is that feeding utensils spread the disease. Vincent's infection certainly spreads through army units in this way, and can be prevented by sterilisation As soon as this possibility was recognised all proved cases at the school had marked individual feeding utensils and during the holidays all the forks, spoons, cups, and tooth mugs were sterilised in boiling water No further cases occurred but the epidemic was anyhow due to end at this time.

Neefe and Stokes (1945) traced one epidemic to well water infected by fæcal contamination, and the *Lancet* (1950) has recently cited experiments by Henle et al. (1950) in which volunteers appeared to develop the disease from a 10^{-3} dilution of infected fæces taken orally If such dilutions can cause infection this might account for the high incidence observed in families and schools (Ford 1943 Gauld 1946 Davis and Hanlon 1946 Naughton et al 1950) Kunkel and Hoagland (1947) describe a family in which 9 out of 10 children developed hepatitis together with 2 of their friends In this case beds were shared and contact very close They *believe that fæcal contamination accounted for this very* high incidence In that epidemic also a large proportion of the cases (6) never developed jaundice.

Study of the present epidemic confirms once again the high infectivity of hepatitis in schools. This depended on *close* contact and the infection spread among those using common cups and cutlery This fact and the symptoms, suggest that contagion is a likely means of spread, and that the mouth is the portal of entry

SUMMARY

An outbreak of infective hepatitis in a boarding school, is described Among 90 people in the school there were 50 cases, and 3 others occurred among outside contacts

As is usual, cases developed in batches, at monthly intervals

The domestic staff of the school, who ate separately, did not contract the disease

A review of the cases, and of relevant published information, suggests that whenever suspicious symptoms occur in a hepatitis contact, strict rest in bed should be ensured so as to minimise liver damage

I am indebted to the parents and doctors of boys who developed the disease in the holidays for their trouble in sending me details of their cases I am specially grateful to the headmaster's wife, and the matron, for their care of the patients, and their notes and comments on the disease, both objective and subjective They both became victims of it Lastly I want to thank Dr E. R Cullinan for his valuable advice and suggestions

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THE HYPOTHERMIC AND ANTIPYRETIC EFFECT OF PREPARATIONS OF A C T H

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A COMMON effect of A C T H in febrile conditions is to lower the body-temperature or even to restore it to normal This action is usually attributed, by implication at least, to a modification of the disease through the release of adrenal cortical hormones, the lowering of body temperature being regarded as secondary to this We find, however, that preparations of A C T H lower body-temperature even in the absence of pyrexia

During routine investigation of samples of A C T H , which involved tests for freedom from contamination by pyrogenic material during manufacture, it was observed that all the samples of A C T H tested lowered the normal body-temperature of the rabbits used

METHODS

The rectal temperatures of trained docile Himalayan rabbits in good health and weighing about 2 kg were measured with thermocouples enclosed in rubber catheters and inserted 6 in into the rectum The animals sat in metal boxes, being restrained only by a metal collar round their necks. Under these conditions, they remained quiet for many hours and retained the catheters in situ during the whole period of the test The room temperature was maintained between 19° and 22°C Injections were made into the marginal vein of the e with py gen fr glasswa needle and sal solution.

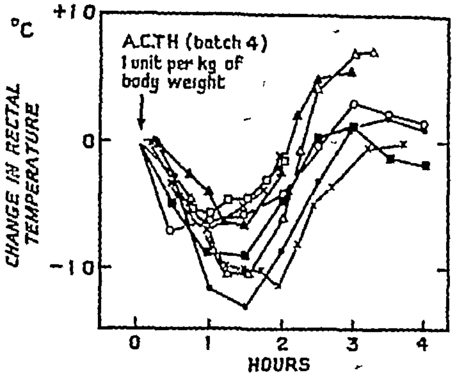

Fig 1—Effect of intravenous A C.T H , batch 4, 1 unit per kg of body-weight on body temperature of eight rabbits

Vario sampl of A.C.T were us each which h been su mitted variou times to tested f freedom from pyrogens We have given them arbitrary bat numbers 1–9 We shall usually refer to this material simply A C T.H , although it certainly contains other substances.

For experiments with posterior pituitary hormone, extrac were made as described by Burn (1937) from samples of t Pituitary (Posterior Lobe) International Standard

To induce artificial pyrexia, a preparation of dried bacter bodies from a strain of *Proteus vulgaris* was used, for wh we are grateful to Dr A A Miles This material has be shown previously (F C MacIntosh and W D M Pato unpublished) to raise the body temperature 1° or 2°C in the rabbits, when injected in a dose of 1 µg per kg of body weigh this pyrexial response typically begins in about 20–30 mi lasts for over 5 hours, and displays a transient part defervescence 2–3 hours after the injection

RESULTS

Hypothermic Effect of A C T H Preparations

Each of the various batches of A C T H lowered t rectal temperature when injected intravenously Th fall in temperature began within 15 minutes of injectio and progressed steadily to reach its lowest point in abou $1^{1}/_{2}$ hours Recovery then took place and followed somewhat similar time course, normal temperature bein restored about 3 hours after the injection Fig 1 show a typical range of responses obtained by the injection o a single sample (batch 4) in a dose of 1 unit per kg o body-weight into each of eight rabbits The respons varies with the sample of A C T H , with the dose given and with the animal used, and considerably larger fall in temperature were sometimes observed Thus, out o twenty-five tests with various batches at this dose leve (1 unit per kg of body weight), the temperature fel more than 1°C on twelve occasions, with a larger dose

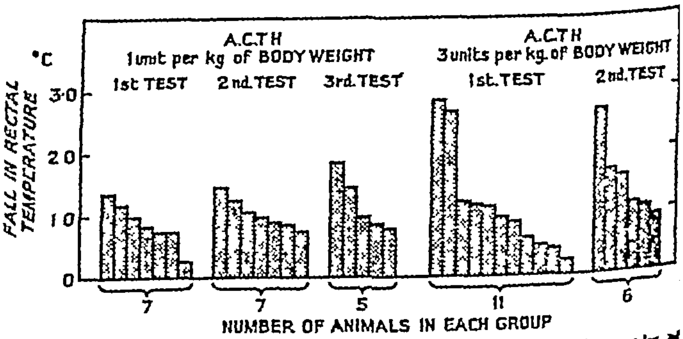

Fig 2—Hypothermic responses of rabbits to A C.T H 1 unit or 3 units per kg of body-weight, with repeated tests on the same animals

REDUCTIONS IN BODY-TEMPERATURE (°C) PRODUCED BY INTRAVENOUS A.C T H.

Rabbit no	A.C.T.H batch no									Dose (units per kg of body weight)
	1	2	3	4	5	6	7	8	9	
12			1·17 (1)				0·8 (3)			1
13			1·81 (3)			1·38 (2)	1·97 (5)			
15			1·01 (4)			1·45 (3)	1·04 (6)			
16				0·5 (4)		0·09 (3)				
24									1·5° (4)	
									0·84 (3)	
28									0·98 (3)	
37				0·74 (1)				1·45 (2)		
38				1·34 (1)				0·81 (2)		
39				0·97 (1)						
40				0·57 (2)	0·24 (1)					
41				0·71 (2)	0·74 (1)					
42				1·25 (3)	0·82 (1)			1·05 (2)		
3			1·19 (1)		2·06 (2)					3
8		0·93 (1)			1·49 (2)					
12									1·07 (3)	
13		1·16 (1)							1·06 (4)	
15	0·48 (1)	0·88 (2)							0·74 (5)	
16			1·13 (1)				1·32 (3)			
17			0·69 (1)							
18	0·45 (1)				1·64 (2)					
22				0·80 (1)						
24				2·07 (1)						
				2·76 (4)						
25				2·83 (1)						
				1·65 (4)						
26	0·21 (1)									

Numerals in parentheses after each result give number of exposure to A.C T.H. for animal concerned

units per kg of body weight, the temperature fell more than 2·5°C in four out of twenty one tests

The values obtained in our experiments are shown in the accompanying table Many of the tests were made on rabbits which had already been injected with A C T H on one or more occasions since it was possible that previous exposures to A C T H might affect the response the number of the exposure is given in parentheses after each result. Two main points emerge from consideration of the data in this table: (1) with the doses studied (1 and 3 units per kg of body weight) each batch of A.C.T.H caused a fall in body temperature on every occasion it was tested and (2) this hypothermic action was observed not only with the first dose of A C T.H in any rabbit but also with all subsequent injections in the same rabbit. From the data it is also clear that the hypothermic response to a given dose of A.C.T.H may vary in different animals or even in the same animal, from test to test. The response, moreover appeared to be greater with bigger doses and tended to increase slightly on a second or third test (fig 2)

Preliminary experiments have shown that this hypothermic action of A C.T H also follows subcutaneous and intramuscular administration, and that intravenous doses as small as 0·1 unit per kg of body weight may be active

Antipyretic Action of A C T.H Preparations

It has been mentioned that these batches of A C.T H had been submitted to scrutiny for possible contamination with pyrogenic substances. Normally these pyrogens are detected by the appearance of pyrexia and the hypothermic action we observed must obviously interfere with such a test. Batch 4 appeared to be particularly free from such activity, but in some samples the hypothermic effect was succeeded by a considerable rise in temperature (fig 3) Since such a rise did not take place in all the batches tested, whereas the hypothermic effect did, the subsequent rise in temperature could not be a consequence of the hypothermia—e g a sort of "rebound" phenomenon. The character and time course of the rise in temperature, when it occurred was compatible with that of pyrogenic contamination If this reasoning were correct, it followed that A C.T.H was modifying the pyrogenic response for normally the pyrexia from intravenous injection of common pyrogenic materials is well established within an hour of injection and near its highest point about another hour later whereas in these tests (as in fig 3) the onset of pyrexial response if any appeared much later being delayed by 1½-2 hours (a time corresponding approximately to the hypothermic phase of the A C.T H)

Our experiments showed that A C T H interferes with pyrogenic activity in the way suggested In the experiments recorded in fig 4 the response to proteus pyrogen (1 µg per kg of body weight) in three rabbits was compared with the response to this pyrogen injected with A C T H 1 unit per kg of body weight (batch 4) in another three rabbits. The rabbits treated with pyrogen alone showed the typical brisk rise in temperature whereas those which received A C.T H in addition gave a more sluggish response, the pyrexia being delayed reduced, and preceded by a fall in temperature. In fact, the effect of injecting pyrogen with A C T H was akin to the response obtained with the more pyrogenic batches of A.C T H (fig 3) Our conclusion that these samples were contaminated with pyrogen was thus corroborated.

It was shown that A C T H could not only delay the onset of a pyrogenic response but also reduce an established pyrexia. Pyrexia was established in two rabbits by injection of the pyrogen 1 µg per kg of body weight at the height of the pyrexia one rabbit was given intra

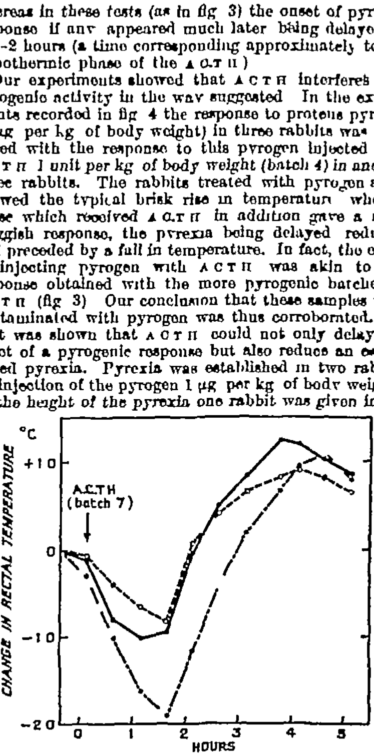

Fig 3—Effect of intravenous A.C.T.H., batch 7 1 unit per kg of body-weight on body-temperature of three rabbits.

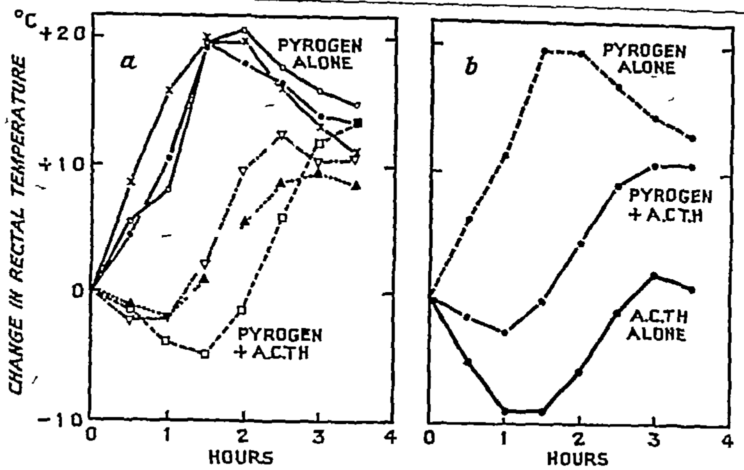

Fig 4—*a*, upper curves, pyrexial responses to intravenous proteus pyrogen 1 µg per kg of body-weight in 3 rabbits; lower curves, responses to intravenous proteus pyrogen 1 µg per kg of body-weight and A.C.T.H., batch 4, 1 unit per kg of body-weight in 3 rabbits; *b*, uppermost and middle curves, data of *a* averaged; lowermost curve, average of responses to A.C.T.H., batch 4, 1 unit per kg of body-weight alone in 3 rabbits

venous A.C.T.H. 1 unit per kg of body-weight, and the temperature rapidly fell to normal, but in the rabbit not treated with A.C.T.H. the pyrexia persisted The experiment was repeated three days later on the same animals with treatment reversed, and the averaged results are presented in fig 5

Effects of A.C.T.H. on Body-temperature not due to Content of Posterior Pituitary Hormone

The material used in these experiments—i e, commercial preparations of purified A.C.T.H. for clinical use—is not completely pure, hence the effects on body-temperature cannot with certainty be attributed to this hormone The consistency of these effects suggests that, if they are not due to A.C.T.H., they must be caused by some other material associated with A.C.T.H. from the earliest stages of preparation, rather than to some casual contamination (comparable to that which renders only *some* of the preparations pyrogenic) One such material is the hormone of the posterior lobe of the pituitary gland, which was known to be present in small amounts in every batch The stated activity ranged from 0·5 to 1·5 units of oxytocic activity per 100 units of A.C.T.H.

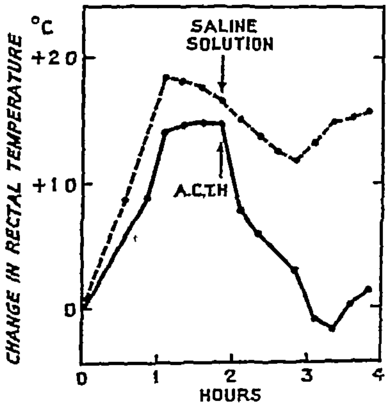

Fig 5—Pyrexial responses to proteus pyrogen 1 µg per kg of body-weight, with and without the injection of A.C.T.H. 2 hours after injection of pyrogen (cross-over test, 2 rabbits, results averaged)

We have therefore compared the effects of A.C.T.H. on the body-temperature with those of a posterior-pituitary preparation In fig 6 are shown the results of an experiment in which, in two animals, posterior-pituitary extract 0·015 unit per kg of body-weight was first injected intravenously, without significant effect on the body temperature, 3 hours later, A.C.T.H. (batch 4) 1 unit per kg of body-weight was injected, giving the usual vigorous hypothermic response The results of another experiment, using a cross over method on two animals, and a higher dose of posterior pituitary (0·1 unit per kg of body weight) are shown in fig 7 Even this large dose of posterior-pituitary extract did not lower the body-temperature, although both animals responded to A.C.T.H. in the usual way.

Just as the presence of small amounts of posterior-pituitary hormone cannot explain the hypothermic actions of the A.C.T.H. preparations, so does it fail to explain the antipyretic effects In fig 8 is shown a comparison in a cross over test on two animals between the effects of A.C.T.H. 1 unit per kg of body-weight and of posterior pituitary hormone 0·1 unit per kg of body weight on the pyrexia produced by the proteus pyrogen The course of the pyrexia is hardly influenced at all by the posterior-pituitary hormone, whereas A.C.T.H. in the same animals produced its usual effect

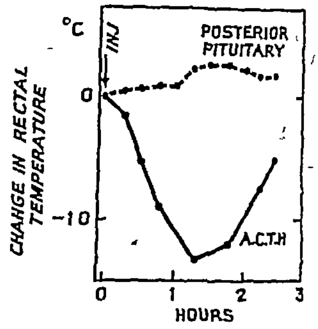

Fig 7—Responses in 2 normal rabbits to posterior-pituitary extract 0·1 unit per kg of body-weight and to A.C.T.H., batch 4, 1 unit per kg of body weight (cross-over test, results averaged)

DISCUSSION

Our experiments have shown that preparations of A.C.T.H. will lower the body-temperature of normal rabbits, will delay and reduce the pyrexial response of rabbits to a dose of pyrogen, and will reduce an established pyrexia This action is not due to contamination with posterior pituitary hormone An antipyretic action of A.C.T.H. has already been reported (Kass and Finland 1950), but the hypothermic action does not seem to have been recorded Cortisone, given for several days previously, is known to reduce the sensitivity of rabbits to a pyrogen (Recant et al 1950)

The importance of these observations for the testing for freedom from pyrogens is obvious The usual pyrogen

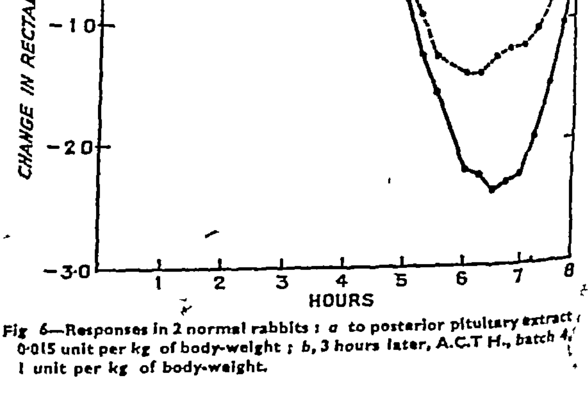

Fig 6—Responses in 2 normal rabbits: *a* to posterior pituitary extract 0·015 unit per kg of body-weight; *b*, 3 hours later, A.C.T.H., batch 4, 1 unit per kg of body-weight.

test (British Pharmacopœia 1948) ends 3 hours after the test material has been injected. The ability of A C T.H preparations to delay the appearance of a pyrogenic response means that a longer test period preferably 5 hours must be used. The difficulties of interpreting the results of such a test in which what is essentially a mixture of drugs of opposing actions is injected, need no emphasis; this problem can hardly be discussed, however in the absence of decisive information about the sensitivity of man to such mixtures and about the dose-response characteristics of these substances in man.

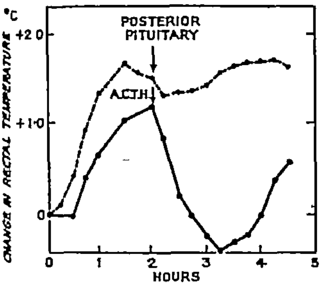

Fig. 8—Responses in 2 rabbits treated with proteus pyrogen 1 µg. per kg of body-weight to a posterior-pituitary extract 0·015 unit per kg of body-weight; and b A.C.T H 1 unit per kg of body-weight (cross-over test, results averaged)

But the existence of this hypothermic and antipyrexial action of A.C.T.H preparations has considerably wider significance than for the control of purity of a drug It suggests that the pituitary may under some conditions, play some part in the normal physiology of temperature regulation. In addition, the effects on body temperature are displayed by doses comparable to those used clinically in man, and the possibility arises that the extensive metabolic or vascular readjustments involved in bringing about such considerable falls in temperature, or the fall in temperature itself, may be of therapeutic importance. The effects of A.C.T.H preparations in a given disease might in part be due, therefore, not to a specific action on the disease but rather indirectly to such vascular or metabolic changes

SUMMARY

Preparations of A.C.T.H cause a fall in the rectal temperature of normal (unanæsthetised) rabbits. The fall in temperature is about 1°C (range 0 24°–1 97°C) with a dose of 1 unit per kg of body weight reaches its lowest point in 1–2 hours and passes off in about 3 hours.

A C T H preparations given simultaneously with a pyrogen, will delay and reduce the pyrexial response to the pyrogen Given after pyrexia has been established A.C.T.H preparations will temporarily lower the temperature to normal or below

The hypothermic and antipyretic actions of A C T H preparations were displayed by all samples tested and were not due to contamination with posterior pituitary hormone.

The significance of these actions in routine pyrogen testing of A C T H preparations and in relation to physiological processes involved in temperature regulation is discussed

We are deeply indebted to Mr C Pergande for his help in these experiments

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EFFECT OF PROCAINE PENICILLIN AND BREATHING EXERCISES IN POSTOPERATIVE PULMONARY COMPLICATIONS

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Postoperative pulmonary complications still occur despite advances in surgery, in anæsthesia and in the use of antibiotics

Penicillin might be expected to lower the frequency and diminish the severity of such complications if the presence of penicillin sensitive organisms in the respiratory tract is an important factor Whipple (1918) and Cleveland (1919) found a pneumococcus type IV to be the common causative organism in postoperative pneumonitis but although the upper respiratory tract may be sterilised by the inhalation of penicillin before operation this method will not by itself prevent pulmonary complications (Holborrow and Spriggs 1948)

Coryllos (1930) showed that obstruction of the bronchial lumen with secretion is the cause of postoperative pulmonary atelectasis. Collapse is most likely during the first twenty four hours after operation (Stringer 1947) when there may be many difficulties in the removal of secretion—namely inhibition of coughing by pain, depression of the cough reflex by postoperative analgesics, viscid sputum, and bronchial spasm (De Takats et al 1942) Breathing exercises are given to prevent the accumulation of sputum in the lungs and to help expectoration

This paper is a report on the effect of penicillin and breathing exercises in preventing postoperative pulmonary complications

METHOD OF INVESTIGATION

An unselected, consecutive series of 160 men admitted for repair of inguinal hernia was divided into four groups using tables of random numbers (Fisher and Yates 1938) These groups were treated as follows:

Group 1—Procaine penicillin 600 000 units intramuscularly before operation in two divided doses; 300 000 units daily for five days after operation.

Group 2—Procaine penicillin (as in group 1) Breathing exercises (diaphragmatic lower costal and posterior basal) twice daily for five days starting forty-eight hours before the operation.

Group 3—Breathing exercises as in group 2.

Group 4—No treatment.

Many factors predispose to postoperative pulmonary complications—including smoking (Morton 1944), bronchitis, and old age—and these we shall discuss in another paper In the present study we have relied upon the random allotment of patients to ensure equal distribution of these factors among the groups (see table I)

TABLE I—DISTRIBUTION OF SMOKERS AND BRONCHITICS

Group and no in group	Average age	No of smokers	No with bronchitis
1 (40)	46 (S.D 12)	31 (77 5%)	16 (40%)
2 (38)	48 (S.D 14)	28 (73 7%)	12 (31 6%)
3 (40)	46 (S.D 16)	28 (70%)	15 (37 5%)
4 (42)	45 (S.D 14)	28 (66 7%)	18 (42 9%)
		$\chi^2 = 1\ 15$ $n = 3$ $p > 0\ 7$ (not significant)	$\chi^2 = 0\ 490$ $n = 3$ $p > 0\ 9$ (not significant)

case was examined ically before operation and thereafter daily X-ray films of the chest were taken on admission and—by means of portable apparatus—after operation Patients were considered to have a pulmonary complication when the postoperative chest film showed a definite abnormality of the lung which did not appear in the original film. No case of pulmonary infarction was seen in this series

Table II shows that the difference between the groups could reasonably have arisen by chance This series therefore provides no evidence that procaine penicillin and breathing exercises, either singly or in combination, reduce the risk of postoperative pulmonary complications

TABLE II—INCIDENCE OF COMPLICATIONS

Group	No *with* postoperative pulmonary complication	No *without* postoperative pulmonary complication
1	6	34
2	7	31
3	8	32
4	5	37

$\chi^2 = 1\ 334$
$n = 3$
$p > 0\ 7$ (not significant)

The duration of productive cough and a fever of 100°F or more is shown in table III These are crude measurements to the nearest half day, but they indicate that the severity of the complication was not diminished by treatment

Work now in progress suggests that, if the obstacles to expectoration can be overcome, postoperative infection or collapse will seldom follow We think that breathing exercises and penicillin fail because the exercises do not help to bring up the sputum and the penicillin does not stop its production

TABLE III—DURATION OF POSTOPERATIVE SYMPTOMS

Group	Duration of symptoms (days)		
	Fever	Cough	Sputum
1	2 5 (S.D 1·4)	4 0 (S.D 1 6)	5 0 (S D 1 6)
2	2 0 (S.D 1 3)	3 0 (S D 1 1)	4 0 (S D 1 3)
3	1 5 (S.D 1 1)	4 0 (S.D 1 1)	4·0 (S D 1 3)
4	1 5 (S D 1 1)	3 0 (S D 1 8)	4 0 (S D 1 5)

SUMMARY

Procaine penicillin and breathing exercises before and after operation did not significantly reduce the incidence of postoperative pulmonary complications in 160 consecutive cases of inguinal hernia

We wish to thank the members of the research grants committee of the Middlesex Hospital, and the surgeons, anæsthetists and members of the department of physical medicine for their coöperation, Dr C G Whiteside for his reports on the X ray films, the records officer and his staff for their assistance, and Prof Alan Kekwick for much help and advice

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A CASE OF SCLERODERMA
FAILURE TO RESPOND TO RECENT

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Workers who investigate a new drug and find it useful are likely to publish their results, but those who try a new drug without success may be disinclined to report their findings This paper records the complete failure of three recommended drugs in a severe case of scleroderma

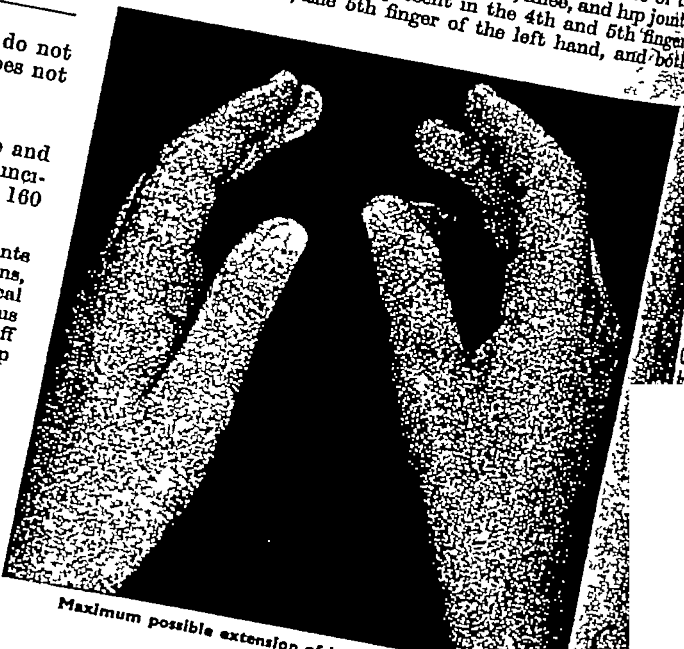
Zarafonetis (1949) treated 4 cases of scleroderma with derivatives of *p* aminobenzoic acid (P.A B.A.) and recorded striking benefit Rennie et al (1951) used 4-3-hydroxy-2-phenyl-cinchoninic acid (H.P C) in 3 cases of scleroderma with considerable clinical and histological improvement Bayles et al. (1950), and others, have had some success with adrenocorticotropic hormone (A C T.H) The following is an account of our experience with these remedies in a girl aged 13

PATIENT'S HISTORY AND CONDITION

The girl was well until the age of 10, when her mother noticed that she was becoming progressively slower in all her activities. The first difficulty was with fine manipulative movements Soon there was difficulty in running and then in walking Within 6 months she was unable to walk more than a few steps, stoop, pick things up, or rise from the lying position, in about another month she became bed ridden. A period of weeks in bed produced some improvement, but severe disability remained and was increasing again when she was first admitted to hospital at the age of 13

She was a well built girl with typical sclerodermatous changes over the shins, forearms, knees, hands, and feet. The skin of the terminal phalanges was thickened, pale, and shiny, and over the bony prominences of the wrist, elbow, and knee, and in many other sites, it was bound down to the underlying bone There was obvious thickening of the skin of the limbs

Movement was limited in the interphalangeal joints of the hands (see figure), and in the ankle, elbow, knee, and hip joints. Contractures were already present in the 4th and 5th fingers of the right hand, the 5th finger of the left hand, and both



Maximum possible extension of interphalangeal joints.

elbows. She could not bend down take off her shoes, pick up objects from the floor or rise from her bed. Before treatment her movements were recorded by cinematograph

Special Investigations —X ray examination showed some osteoporosis of all bones. The erythrocyte-sedimentation rate was normal (0 mm. in 1 hour) Blood urea 21 mg blood-creatinine 0·6 mg., urinary creatinine 172 mg urinary creatine 199 mg per 100 ml., urea-clearance 85% of normal, urinary 17 ketosteroids 3 3 mg excreted in 24 hours

TREATMENT

Sodium *p*-aminobenzoate was started in doses of 33 3 mg per lb body weight per day She was given 1 g three times a day for 4 days, and then 1 g four times daily The course lasted for 35 days and no toxic reactions were observed; but she was if anything slightly worse after treatment

On readmission a year later her disability had increased and there was further limitation of movement. A course of A.C.T.H (Armour) was started She received 1 2 g over a period of 35 days. On the first day she received a total of 120 mg in 4 hourly doses and on the second day 80 mg She was then given 40 mg daily for the next 16 days, and thereafter 20 mg daily The batch of A.C.T.H used was known to be effective but there was no response to treatment

A course of H.P.C. was then given She had 1 g daily divided into 4 doses for 21 days There were no toxic symptoms. Neither at this time nor subsequently was there any improvement; in fact her condition has slowly deteriorated.

There was no response at all to any of the three drugs used The condition was admittedly advanced when the drugs were used but Rennie et al (1951) thought that H.P.C might be of more value in such cases than in early ones

SUMMARY

A girl aged 13 suffering from scleroderma, was treated with sodium *p* aminobenzoate (P.A.B.A.) adrenocorticotropic hormone (A.C.T.H.) and 4-3 hydroxy 2 phenyl cinchoninic acid (H.P.C.) There was absolutely no response to treatment slow deterioration occurring throughout

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TERRAMYCIN IN THE PROPHYLAXIS OF OPHTHALMIA NEONATORUM *

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AT the beginning of 1951 a small quantity of terramycin became available through the Antibiotics Clinical Trials Committee of the Medical Research Council and it was decided to assess its value in the prophylaxis of ophthalmia neonatorum

METHOD

The trial was divided into two parts, testing (*a*) eye drops and (*b*) ointment

The eye-drops were made up by adding 25 mg of crystalline terramycin hydrochloride to 62 5 mg of sodium chloride and 25 mg of crystalline sodium borate already sterilised for one hour at 150°C in a 10 c.cm. McCartney bottle The bottles were stored in the refrigerator until required. For actual use the contents were mixed with 5 ml of sterile distilled water making a strength of 5 mg per 100 ml. Once dissolved the solutions were discarded after forty-eight hours.

TABLE I—RESULTS OF PROPHYLAXIS BY TERRAMYCIN

Method and group	Sex	Total	Cases of ophthalmia	Difference (%)	Standard error (%)
Drops					
Treated	M	254	7 (2·9%)	1·1	1·72
Controls	F	204	10 (4·0%)		
Ointment					
Treated	M	270	12 (4·5%)	2·5	2·1
Controls	F	250	18 (7·0%)		

The difference between treated and untreated cases is not significant in either group

The *ointment* was dispensed, as suggested by the makers, in a strength of 1 mg per 100 g in a sterile petrolatum base in eye-ointment tubes. These were made up as required and stored in the refrigerator when not in use

Female infants were used as controls, the eyelids being wiped gently with small dry sterile squares of white lint immediately after birth In males the eyelids were similarly cleaned and two drops of the terramycin solution or about 30 mg of terramycin ointment was then instilled into each conjunctival sac

RESULTS

Ophthalmia was defined as a definite purulent conjunctivitis. Transient watery discharge or crusting were uncommon and were not included The results were substantially the same for the treated and the control groups (table I)

DISCUSSION

With the antibiotics now available ophthalmia neonatorum is no longer difficult to treat, and gonococcal infection is today very rare in maternity units in this country Nevertheless, ophthalmia neonatorum is still a considerable nuisance In the first place it is the commonest form of neonatal minor sepsis and secondly it usually starts in the later days of the lying in period and may delay the mother's and baby's return home Any attempt therefore to reduce the incidence by prophylactic measures is worth while.

TABLE II—OBSERVATIONS ON ALL CASES OF OPHTHALMIA NEONATORUM AT HAMMERSMITH HOSPITAL IN THE YEARS 1947–51

Year	No of births	Prophylaxis	Incidence of ophthalmia (%)
1947	2257	Penicillin drops	1·5
1948	2088	Penicillin drops	4·4
1949	1907	Nil	1·8
1950	1850	Saline drops	6·0
1951	1287	Saline drops then terramycin trial	5·7

Up to Oct 31

Table II shows the number of cases at Hammersmith Hospital during the five years 1947–51 as noted by successive resident pediatric registrars who were responsible for examining all the infants.

During these five years there has been no major alteration in the care of the infants, and bacteriological control of the staff and the strictest possible isolation of the most trivial infection has been constantly practised but in assessing the value of the various prophylactic measures, it is not entirely permissible to compare one year with another for there are many other variables Taken with the terramycin trial however the results seem to justify the claim that simple cleaning of the eyelids besides being easier is at least as effective as any other method In respect of silver nitrate this conclusion was reached by Taylor and Calman (1948) It would seem too that the way to reduce the incidence of ophthalmia neonatorum and other infections in the new born is along other lines as suggested by Watkins (1952)

CONCLUSIONS

Terramycin is of no value in the prevention of ophthalmia neonatorum.

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* A report to the Antibiotics Clinical Trials (non tuberculous conditions) Committee of the Medical Research Council.

It is confirmed that simple cleaning of the eyelids is as effective as any other form of topical prophylaxis

I wish to thank Prof A. A. Moncrieff for his advice and for permission to instigate this trial on infants under his care, and Miss M. C Tweddle and her nursing staff in the department of obstetrics for the punctilious way in which they carried out all treatments

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Reviews of Books

Tumeurs malignes de la vessie

Traitement par la radiumtherapie à vessie ouverte. RAYMOND DARGET, professeur de clinique urologique à la Faculté de Médecine de Bordeaux Paris Masson 1951 Pp 105 Fr 1200

THIS little book describes the treatment of cancer of the bladder from the viewpoint of the genito-urinary surgeon. A discussion of the lymphatics of the bladder is followed by a satisfactory and well-illustrated account of the types of tumour found in the organ, and by a description of various methods of cystography with the ordinary opaque media, air, and a special medium by means of which the tumour is outlined with an opaque layer. Some excellent radiographs show that this new method offers greater accuracy in radiographic diagnosis There are also some first-class pictures obtained by perivesical injection of air or oxygen An unusual technique is the use of a balloon, containing lead nitrate, to protect the healthy part of the bladder during treatment with radium needles The great risk of this treatment is infection, leading to acute cystitis, but the new antibiotics have reduced the danger of this complication The operation is carefully described. After special preparation the bladder is opened with a diathermy knife, the tumour is inspected and its limit defined, and it is then levelled until all papillomatous growth has been removed and the base of the tumour can be seen The radium needles are next implanted in the bladder wall, diathermy being used to sterilise each track The protective balloon is inserted and the bladder closed on a Marion tube When the incision has been sutured the balloon is filled with a saturated solution of lead nitrate After a week the balloon and needles are removed, but drainage continues and the cystotomy is kept open for about a month for regular washing out of the bladder In some cases the balloon is used as a surface applicator carrying needles against the tumour, and some ingenious applicators have been devised to hold radium in the ureters. Unfortunately the questions of dosage and dose distribution are completely ignored—a strange omission in an otherwise interesting account of an original method of treatment

Documenta Ophthalmologica

Secretary of the board of editors JEAN NORDMANN Vol v–vi The Hague Uitgeverij Dr W Junk 1951 Pp 585 Dutch guilders 72

THIS double volume of *Documenta Ophthalmologica* is dedicated to the memory of F P Fischer, one of its founders and editors His extensive and fundamental contributions to ophthalmology are shown in the list of publications and in the tributes by the contributors

It opens with a characteristic contribution from Fischer on cyst and cystoid degeneration of the retina His experimental studies suggests that choroidal sclerosis, with obliteration of perivascular fluid spaces, is the underlying cause of the accumulation of fluid Ocular pathology is represented by the papers of Friedenwald on metaplasia of conjunctival and corneal epithelium, Nordmann and Brini on melanomata of the choroid and Koch on the fate of gases in ocular tissues. Tschermak Seysseneggg on polarisation of daylight, Burian on stereopsis, Goldmann on the flow of aqueous, and Ascher on terminology of aqueous veins, are all useful contributions to ocular physiology Problems of protein chemistry of the eye are discussed by Schaeffer, while Fischer and Nordheim deal with the sugar-content of subretinal fluid Genetic studies are contributed by Brückner in a detailed account of slit-lamp ophthalmoscopic appearances of the eye of the rat and the mouse, whilst Sorsby, Roberts, and Bram give an account of essential shrinking of the conjunctiva in two sisters Other contributions to this volume maintain the same high level of academic and clinical research

Progress in Neurology and Psychiatry

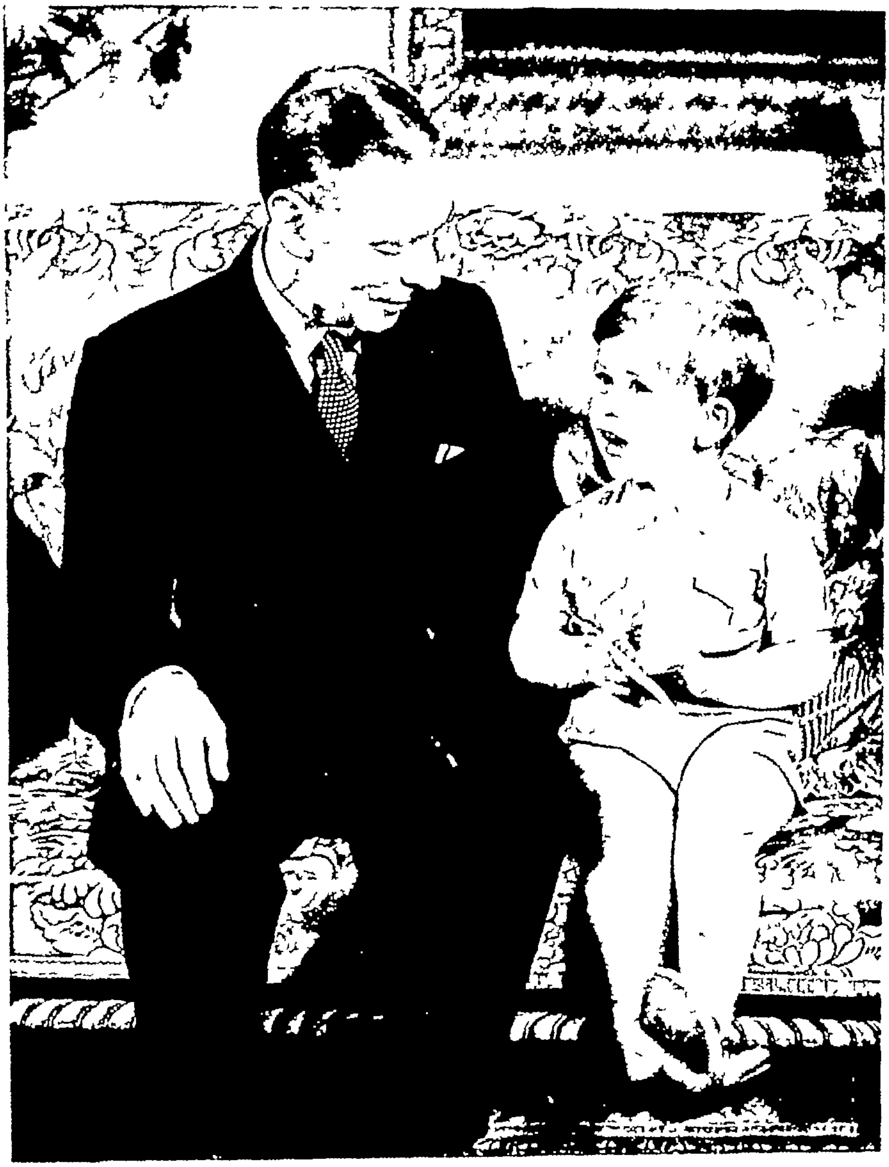
An Annual Review Vol. VI Editor E A. SPIEGEL, M D, professor and head of department of experimental neurology, Temple University School of Medicine, Philadelphia, Pennsylvania New York Grune & Stratton. 1951 Pp 562 $10

As in previous years, neurologists are given more space and use it better than psychiatrists Neurologists and psychiatrists alike, however, tend to offer piles of abstracts, in which the sun shines indifferently on just and unjust, good and bad, when the reader would prefer a critical review Least guilty of this mechanical sin are those responsible for the chapters on basic sciences, and writers like H Teuber and Morris Bender on neuro-ophthalmology, or A. S Marrazzi and Ross Hart on pharmacology, who are thoroughly at home in their subject. At the other extreme are the contributors on child psychiatry, who lavish such adjectives as outstanding, inspired, magnificent, and brilliant, and those on mental hygiene, who retail platitudes, programmes, and conference meetings It is difficult to account for the absence of psychology from the basic sciences, though the enormous output under this head would make it imperative to select drastically the valuable and relevant papers An index of authors, as well as of subjects, would add to the usefulness of the review, which, in spite of the infirmities incident to yearbooks, renders a considerable service to neurologists and psychiatrists

Clinical Practice in Infectious Diseases *for Students, Practitioners, and Medical Officers*

(4th ed. Edinburgh, E & S Livingstone 1951 Pp 717 30s) The fourth edition of this well-known textbook follows the general plan of the last Dr E H. R Harries, Dr Maurice Mitman, and Dr Ian Taylor have been busy revising, extending, and bringing up to date, and have added several new illustrations, some of them in colour Of the revised sections, that on the rickettsial diseases, including an account of Q fever by Dr E H. Derrick, is particularly good. The chapters on epidemiology and the management of infectious diseases continue to be outstanding, though there are many items of clinical interest and importance which need further revision. Thus acute laryngo tracheo bronchitis of children, a dangerous and not rare disease, deserves more than a passing footnote, and the administration of sulphonamides by the nasal tube to unconscious cerebrospinal fever patients has been replaced by intramuscular injection of a sulphathiazole derivative. Again, the frequency and importance of pulmonary collapse in whooping-cough deserves more space, while the intradermal tests advised for the detection of hypersensitiveness to serum hardly present a true picture of the practice in the majority of our fever and general hospitals On the other hand, it is pleasant to read a correct definition of the Schick test dose, a short but informative account of canicola fever, and some just if caustic remarks on the Kenny concept of poliomyelitis For the medical student new to fevers, the array of facts and references may prove forbidding, and he may find the text difficult in places But for the specialist in infectious diseases, the epidemiologist, the medical officer of a fever hospital or of a public-health department, and for the inquiring practitioner, the book will continue to be a valued companion.

Semiologia y Psicopatologia de los Procesos de la Esfera Intelectual (Buenos Aires: El Ateneo 1951. Pp 318) —The contents of this book have been presented for the last seven years in Dr Carlos R Pereyra's postgraduate lectures in Buenos Aires He casts his net wide, and deals with hallucinations, illusions, disorders of attention, memory, imagery, and thought, as well as intelligence His treatment of these subjects is much influenced by French writers, but shows little contact with recent psychological research



KING GEORGE VI AND PRINCE CHARLES
November 14, 1951

THE LANCET

LONDON SATURDAY, FEBRUARY 16, 1952

From Generation to Generation

The King's life had the happy ending he had so well earned Last summer he was gravely ill with an obstructive bronchial lesion causing toxæmia But the *pneumonectomy performed* on Sept. 23 brought immediate relief by removing the infection, and his recovery from the operation was so straightforward that he did not think it as serious as it really was When he was seen by some of his doctors for the last time at the end of January the condition of his chest was so far as could be judged entirely satisfactory and he felt so well as to express his thankfulness that his daughter would, after all be spared for a time the burden of sovereignty Unhappily there remained the danger of death from arterial disease, which had been so much in the minds of his advisors in the previous three years The sympathectomy and other measures undertaken in March, 1949, to improve the circulation of his lower limbs had left The King unexpectedly capable of activity and his last day was spent enjoyably in shooting over the Sandringham fields and woods But no precaution can remove the risks associated with advanced arteriosclerosis, and during the night of Feb 5–6, without warning symptoms and apparently without awakening, he died of coronary thrombosis

The work of a king as of an artist may not be fully or justly appreciated in his lifetime we too seldom think of the worth of things or people before we lose them. But in the past few years the nations of the Commonwealth had become more and more consciously aware that King George VI was playing almost faultlessly his great and difficult part in their affairs The special merit and the special appeal of this achievement lay in its peculiar difficulty for him The young man to whom public conversation was an ordeal, and who hesitated in his public utterances was suddenly called to assume a somewhat shaken throne and the titular headship of an Empire entering the period of its greatest danger, The strain thus imposed on body and mind was intense but The King's courage and will, reinforced by those of his wife, were equal to his task; and he never failed in his duty Lacking the easy charm of some of the House of Windsor, his triumph was mainly one of character, and it came slowly But today looking back over the fifteen years of upheaval one wonders whether any other kind of king could have been more useful than this modest steadfast man who did so much by quiet example He became, indeed the true pattern of a constitutional monarch and a measure of his achievement is the fact that, though his reign has seen a social revolution and the relinquishing of empire he leaves his throne far firmer and even more important, than it was when he ascended it

To those who recall the intellectual and political climate of the early part of the century it may well seem strange that the Monarchy in this country should not only have survived but still be gaining in significance Yet it is clearly doing so The proclamation of Queen Elizabeth gives her the new title of Head of the Commonwealth, and today it is the Crown, almost alone that holds together a great group of self governing peoples of various race More surprisingly, our Royal Family form a bond with a great many people in other countries who have come to share our interest in them. Neither of these things could have happened had our Chief Citizen been an elected and impermanent person, without the touch of divinity that still hedges a king of ancient lineage To people abroad as well as at home, the British Crown, in its simplicity and its splendour, is something that goes on from generation to generation—a thread that leads the minds of children back through the history of their country and helps to give continuity to the national life A nation like an individual has to adjust its present and its future to its past, and the more rapid our social changes the more value attaches to this continuing element in our Constitution The inspired device by which the Head of our State is raised above political controversy has successfully adapted an ancient institution to a new age, and, though other systems of government may be more democratic, more modern, or more immediately efficient, none perhaps is so well designed to reconcile the requirements of representative government with the deep-seated desire of human groups to offer unquestioning loyalty to a leader Following a cultural pattern established for many thousand years human beings still feel the need to identify themselves, whether in joy or sorrow, with their chieftain and his family, and this need cannot be fully met by leaders whose tenure of office is temporary The materialist or reformer may deplore such popular traits, but neither the statesman nor the anthropologist will make the mistake of supposing that emotions became unimportant when man began to reason, or that symbols have been an anachronism since the invention of the electric telegraph

Those who seek to create a rational world have to contrive that emotions and symbols shall serve a useful, not a baneful purpose and the vital function we nowadays look to the Monarchy to perform is the preservation of a sense of unity among its subjects When all share the same sovereign his existence enables all his people, great or small to regard themselves as members of one family of which he is the benevolent father The unity thus engendered cannot be weighed or assessed, and it is very far from complete, but it is none the less real. And it was never more evident than in these days when the nation mourns a king worthy of its loyalty, and welcomes a successor of like spirit who already has a place in our hearts

The Liver and Endocrine Dysfunction

THE liver has long been known to have complex and diverse functions, and it has lately been found to play a conspicuous part in endocrine control by inactivating hormones produced elsewhere in the body. Thus ZONDEK[1] showed that in vitro the liver inactivates 80–90% of added œstrogen, while ISRAEL et al[2] found that the hormone was destroyed by perfusion through a heart-lung-liver preparation but not through a heart-lung preparation. BISKIND[3] implanted pellets of crystalline œstrogens and androgens into the spleens of castrated male and female rats. When the spleen was left in its normal anatomical relation to the liver no hormonal effect ensued, but when the spleen was transplanted from the portal to the systemic circulation the specific hormonal effects rapidly appeared. The chemical changes which these compounds undergo in the liver are still being studied. Most is known about the œstrogens. Some of these are excreted into the bile in an active form and are partly reabsorbed from the intestine, thus undergoing an enterohepatic circulation like the chemically related bile-acids.[4] Some oxidative degradation also occurs, and part is incorporated into an inactive lipoprotein complex which circulates in the blood. ROBERTS and SZEGO[5] have suggested that this inactive form in the blood is in equilibrium with an œstrogen glucuronide, from which the free œstrogen is liberated in the susceptible end-organs by the enzyme β glucuronidase.

Clinical experience indicates that impaired hepatic function is commonly associated with endocrine imbalance, particularly of the sex hormones. As long ago as 1908, KELLY[6] reported menorrhagia and metrorrhagia early in the course of cirrhosis, and GLASS et al[7] drew attention to the association of gynæcomastia and testicular atrophy with cirrhosis of the liver. Furthermore, other features of liver failure, such as palmar erythema and cutaneous spider nævi, are now regarded as evidence of hyperœstrinism.[8] Recognition of the importance of nutrition in maintaining the functional and structural integrity of the liver has led to a better understanding of the relation of the liver to steroid-hormone metabolism. BISKIND has drawn attention to the importance of the B vitamins, especially thiamine and riboflavine, in enabling the liver to maintain the normal balance between androgens and œstrogens. Thus, when castrated female rats with œstrone pellets in the spleen were maintained on an adequate diet they remained anœstrous, but when placed on a diet deficient in the B complex they went into continuous œstrus. Further studies by BISKIND and his collaborators showed that, in addition to thiamine and riboflavine, methionine was necessary for the normal hepatic control of these hormones. In contrast to the œstrogens, the hepatic inactivation of androgens, at least in rats, does not seem to depend on an adequate intake of B vitamins, since no evidence of androgenic activity appeared in BISKIND's animals with steroid implants in the spleen, whether the dietary level of these vitamins was normal or deficient. Experimental evidence has lately implicated other factors. FERRET[9] has reported that castrated female rats either on a necrogenic diet deficient in thioamino-acids and α-tocopherol, or on diets deficient in lipotropic factors, also lose the power to inactivate œstrogens implanted in the spleen, and hence go into continuous œstrus. This could be readily prevented by the addition of cystine, but not of α-tocopherol, to the necrogenic diet, and by the addition of choline to the alipotropic diet. Liver poisons, such as carbon tetrachloride, also impair this important hormone-controlling activity of the liver.[10]

Experimentally, therefore, the ability of the liver to inactivate œstrogens seems to be very sensitive to hepatotoxins and to deficiency of nutritional factors, and conceivably hormone imbalance could arise clinically in the same way. In a series of 450 cases studied by BISKIND, a striking correlation was indeed found between manifestations of nutritional deficiency and syndromes related to excess œstrogen. In women these manifestations include various menstrual disturbances, painful breast changes, and acne; and in men gynæcomastia, softening of the testes, loss of axillary hair, and decreased libido. In both sexes infertility may occur. Treatment with vitamin-B complex, especially in the form of desiccated whole liver, produced, in addition to the healing of the vitamin-deficiency lesions, rapid and dramatic improvement in the endocrine disturbances. Still more striking, perhaps, are the results described by LONG and SIMMONS.[11] Most of their patients were not obviously suffering from either liver disease or malnutrition, and the endocrine disturbance therefore appears to have been the primary complaint. Of the 35 patients in their series only 7 had a history of jaundice (presumably due to infective hepatitis) and 1 of severe alcoholism. In the remaining 27 cases, as far as can be inferred from the data in their paper, there was no reason to suspect impairment of hepatic function. Nevertheless, symptoms suggestive of hyperœstrinism, such as cyclic pain and tenderness of the breasts and dysmenorrhœa, were present and resisted the usual therapeutic measures. The response to a high-protein, low-fat diet richly supplemented with B vitamins and crude liver extract was in all cases good or excellent. In the 2 cases with overt liver disease that are reported in detail, the effect of this régime on the symptoms attributable to hormonal imbalance were truly impressive. It is a great pity, however, that a control series was not observed simultaneously.

That the part played by the liver in the metabolism of the steroid hormones is not confined to the sex hormones seems highly probable. There is already some evidence that deoxycortone and some of the naturally occurring corticoids are metabolised in the liver. DE ANDINO et al,[12] using the thymic weight test in mice, found that the minimal effective dose of rtisone is fifteen times higher by the oral than by e subcutaneous route. This is, of course, at variance ith recent clinical experience; but, as these workers int out, the inactivating capacity of the liver may easily saturated, and consequently with large ses no significant difference would be detectable tween the different routes of administration. evertheless within the physiological range, this nction of the liver may be of great importance. seems highly probable that the intrahepatic etabolism of steroid hormones is not confined to *x hormones and is of significance in the whole* alm of endocrinology.

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Hunger and the Land

How many people can the land support? Was ALTHUS right when he propounded the thesis that ankind by an inexorable nemesis outgrows his wn food supply? Are hunger and starvation there ore inevitable? This is now a fruitful theme for ebate. *The neo-Malthusians have recently found a* ighty supporter for their pessimistic philosophy n WILLIAM VOGT, whose book *Road to Survival* as been a best seller. They have also found some upport from the official records of the Food and griculture Organisation of the United Nations[1] hich show that at the moment, despite the potentialities of agricultural science, increase in agricultural roduction is not keeping pace with the growth of uman population. A new opponent of MALTHUS has isen, however, in Dr JOSUÉ DE CASTRO,[2] director f the institute of nutrition in the University of razil, and chairman of the Executive Council of F.A.O. Appropriately this new champion of human ptimism comes from a go-ahead country which is st beginning to develop her own immense latent sources for food production.

DE CASTRO's main thesis is that overpopulation tself does not cause starvation in various parts of he world, but that, paradoxically, starvation is the ause of overpopulation; and he points out that the opulations of China, India, and Japan, though epeatedly assailed by starvation, continue to multiply. Experience has shown that it is difficult, if not mpossible, to *eliminate hunger* by controlling the rowth of population. It is possible, however, to everse the process and control the growth of population by doing away with hunger; once a people is enabled to rise above the poverty level the birth rate always *declines. DE CASTRO quotes the World* Health Organisation as stating that some 300 million people, mostly peasant farmers, suffer regularly from malaria. If humanity should decide to put away malaria, as is technically possible, we could count on many million more hands producing food. A spectacular rise in food production would ensue and a new demographic balance arise at a healthier level. To support this argument, DE CASTRO briefly reviews the story of famine in four continents. The main and fundamental causes of hunger and food shortages he claims are not natural catastrophes but unjust systems of land tenure, rapacious landlords, and colonial exploitation. To survey the complex stories of world famines in 162 pages is a bold effort; and naturally the critic can find much that is left unsaid. The impression is repeatedly given that the British Empire was run entirely by greedy and unscrupulous merchants. Even if it should be conceded that on balance the economic state of the colonial peoples improved little, on the credit side stands the immense benefits from the introduction of a *widespread* educational system and a just judiciary, which have proved of great value against poverty and starvation. Moreover it is, to say the least, unfair to a great man who introduced many not altogether *unsuccessful measures to mitigate famine in India* to dismiss WARREN HASTINGS in two sentences as a common criminal. Nevertheless, though brevity may not always make for accurate historical judgment, the main thesis that unjust systems of land tenure are at the root of most human hunger is probably correct. In modern times it is certain that the failures of the CHIANG KAI SHEK régime in China were associated with an inability to assist the peasant farmers in their struggle against hunger. The future successes or failures of Communism or democracy in Asia are less likely to be achieved by ideological battles or by tanks and atomic bombs, than by practical results in agriculture. The peasants will inevitably fall into the political system which allows them to farm their land the more efficiently.

On the technical side DE CASTRO quotes the following figures: of the 56 million square miles of solid earth on our planet 30% is covered with forest, 20% is *grassy plains, 18% is mountainous and 32% is torrid* or polar desert. The 16,000 million acres of forest and arable land is available for cultivation; it is equivalent to 8 acres per head of our present world population. As yet the area cultivated is but 2000 million acres—an eighth of the earth's natural possibilities. Can this new land be brought under the plough? Professor NICOL[3] stated categorically last week that there are no more new lands; and he even questions our ability to maintain the fertility of those we already cultivate. DE CASTRO, in whose country the vast Amazon basin is almost unvisited by scientific man, would flatly deny this assertion. The future will decide between them. We should not underestimate the inventiveness of man: a group of British scientists[4] have recently indicated the possibilities of increased food production by new technological developments. Today it would seem that the immediate limitations to our food production are imposed not by any lack of agricultural knowledge but rather by political organisations which prevent the full exploitation of agricultural knowledge. Our fundamental food problems are political, not technological. Indeed Lord BOYD ORR, in a foreword to DE CASTRO's book, points out that the title might be *Hunger and Politics*.

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[1] See *Lancet*, 1951, ii, 826.

[2] de Castro, J. Geography of Hunger. With a foreword by Lord Boyd Orr. London: Gollancz. 1952. Pp. 338. 18s.

[3] Nicol, H. *Lancet*, Feb. 9, 1952, p. 313.

[4] Four Thousand Million Mouths. Edited by F. le Gros Clark and N. W. Pirie. London, 1951. See *Lancet*, 1951, ii, 1122.

The executive board of *W.H.O., meeting in Geneva*, has decided that Tunisia, Algeria, Morocco, and Greenland should be included in the European region, and Italian Somaliland in the Eastern Mediterranean region. Dr Norman D. Begg (Scotland) has been sworn in as director of the regional office for Europe, and Dr François Daubenton (Netherlands) as *director of the regional office for Africa.* The board is to meet again on May 29 after the fifth World Health Assembly which will sit from May 5 to 24.

GASTRO-INTESTINAL REACTIONS TO ANTIBIOTICS

IT is now well known that the antibiotics—particularly aureomycin, chloramphenicol, and terramycin—may produce lesions in the gastro-intestinal tract Harris[1] found, in a series of 110 patients with brucellosis who were treated with aureomycin or chloramphenicol, that nearly two-thirds of the females and one fifth of the males developed nausea, vomiting, epigastric discomfort, heartburn, or diarrhœa, and diarrhœa sometimes persisted for several weeks after treatment was stopped Many of the female patients had oral complications, including vesiculopapular eruption on the mucous membrane of the palate, cheeks, pharynx, and lips, angular stomatitis, and glossitis Commonly these were accompanied by vulval and anal irritation, and 2 patients had anal fissures with bleeding Tomaszewski[2] noted oral complications in 39% of 126 patients treated with aureomycin and chloramphenicol for infective conditions; and he too found that many complained of anal and genital irritation sometimes associated with bleeding Manheim,[3] of New York, has collected 100 cases in which anorectal complications followed about a fortnight after taking aureomycin, chloramphenicol, or terramycin All these patients complained of perianal itching associated with pain, a burning sensation, and bleeding on defæcation, many of them also had diarrhœa which came on soon after taking the antibiotics Examination revealed erythema, thickening, and excoriation of the skin in the perianal region, associated in some patients with multiple superficial fissures at the anal margin, in a few ulceration was observed in the rectum and colon

Why antibiotics produce these complications is not clear. There is no doubt that, by eliminating a wide variety of sensitive bacteria, antibiotics cause a drastic change in the intestinal flora This is evident from bacteriological examination of the stools of patients receiving aureomycin or chloramphenicol, and from the fact that the stools of these patients are often odourless One result of bacterial destruction is interference with the normal production of the vitamin B complex, which depends on bacterial synthesis, and since the oral lesions closely resemble those resulting from vitamin B deficiency it was at first thought this was the most important causative factor Both Harris and Tomaszewski found that such complications were less severe when patients were receiving vitamin B On the other hand these complications occur even when patients are given adequate amounts of this vitamin parenterally, and so other factors must be at work

Another possible result of eliminating sensitive bacteria is the proliferation of non sensitive organisms That this takes place is suggested by the finding[1,2,4] (to which we have already referred[5]) of fungi, particularly *Candida (Monilia) albicans* in oral and perianal scrapings from patients with lesions resulting from antibiotic therapy This organism has also been isolated from the stools of patients with diarrhœa from the same cause *C albicans* is normally not pathogenic but might become so as a result of the abnormal conditions produced by the antibiotics Possibly, as Harris suggests, the gastro intestinal complications are produced by an overgrowth and increase in virulence of *C albicans*, acting on a mucous membrane whose resistance has been reduced by vitamin-B deficiency It is more than probable, however, that the alteration in the intestinal flora has other sequelæ which have not yet come to light, and which are also partly responsible.

These con ions, though not usually se rise to considerable inconvenience. Routine tration of vitamin-B complex would seem in all patients receiving chloramphenicol, au or terramycin Harris found that the effective when giving parenterally, but a by mouth suffices unless troublesome lesions have developed. The other measures so far tried con giving lactobacilli in various ways, in an attem restore the normal intestinal flora and diminis growth of fungi Willcox[6] has used yogurt, and observed a striking improvement of the complications after giving *Lactobacillus* buttermilk A simpler method might be to which is thought to encourage the growth of lacto and it would be interesting to try the effect of giving sugar prophylactically to patients receiving antibiotics.

THE YOUNG MOTHER AT WORK

REARMAMENT and the introduction of a numbe light industries have restored prosperity to but one continuing effect of past economic has been the growth of social inquiry Last autumn Northumberland and Tyneside Council of Social asked Sir James Spence, Nuffield professor of health, to promote a conference on the subject of young mother at work, and on Dec. 15 a group of delegates from a variety of local organisations came together An industrialist, the head of a large fa business in the city, a representative of the Minist Labour, a medical officer of health, a pædiatrician, a grandmother who is also the vice president of the In national Union of Family Organisations, tried to pres the facts as they find them in their daily work. It was sensible conference, restrained and challenged by th imposing lack of factual answers to the obvious questions How many mothers are working? What kind of work do they do? Why do they go out to work? Who looks after their children? What are the effects on the child, the "minder," and the mother herself?

The Ministry of Labour keeps records of marrie women in employment, but it has no knowledge of their family commitments The medical officer of health knows the number of children attending day and residential nurseries (and the cost to the community), but in Newcastle, at least, these children are only a small fraction of those with mothers at work The health visitor is aware of those mothers in her parish who ar fully employed, but her contact is not always sufficiently frequent or intimate to cover the shorter periods of work which mothers undertake A family survey of the kind that is being carried out in the university department of child health in Newcastle gives a more reliable index, while the national investigation of the Royal College of Obstetricians and Gynæcologists and the Population Investigation Committee will eventually give a picture for the whole country

In 1950 a Ministry of Labour survey estimated that of 7 million employed women about 2,850,000 were married. Although the number of these with children under 14 years of age is unknown it cannot be much less than 1 million Douglas,[7] in the first report of the national survey, found that 28% of married mothers and 75% of unmarried mothers were in full-time occupations at the beginning of a pregnancy which led to their confinement in the week of March 3–9, 1946 The majority gave up work by the middle of their pregnancy, and in those who continued to work there was a greater risk of premature delivery and stillbirth Two months after delivery only 6% of the married primiparæ and 3% of the multiparæ said that they intended to return to work In the next 4 years 24% of all the mothers were in paid employment at some time or another[8] In the Newcastle survey, of just over 1000 mothers with families containing an infant born in May or June 1947 7% went out to work in the first year and 18% were working during 1951 and rather more than half of these were in full time occupations. Analysis of motives is difficult; but economic need was not unexpectedly, the main reason for working and in only 18% of cases was there a deliberate choice of work for its own sake. Three quarters of the children were looked after within the family circle while the mother was at work, with granny carrying the main share of the burden Four out of five of these infants appeared to be growing and developing as well as those who were with their mothers at home In the remainder, where development and behaviour were less satisfactory the mother's going out to work was only one element in the general inadequacy or instability of the family Happiness and sound emotional development are however less easy to measure than growth or infective illness

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[1] Harris, H J J *Amer med. Ass* 1950 142 161
[2] Tomaszewski T *Brit med. J* 1951 1, 388
[3] Manheim S D *N Y St J Med* 1951 51 2759
[4] Woods J W Manning I H Patterson C N *J Amer med Ass* 1951 145 207
[5] *Lancet* 1951 ii 632
[6] Willcox R R. *Ibid* p 154
[7] Douglas J W B Maternity in Great Britain London. 19
[8] Douglas J W B Personal communication

This is still a minority problem; at least three quarters of the mothers in this country stay at home with their young children With the rising cost of living and the renewed demands of industry the proportion at work may be increasing, and it is disturbing that so many of the elementary facts necessary for deciding social policy in this matter are unknown. The Newcastle conference, with all its limitations, has served a useful purpose Moreover, the pattern of the conference which brought together public, local authority and university, might well be followed for other subjects and in other places.

CARDIOLIPIN ANTIGENS

CARDIOLIPIN a complex acid phospholipin containing no nitrogen is the active principle contained in the tissue extracts used as antigens for the demonstration of syphilitic reagin The isolation of this reagent from ox heart-muscle by Mary Pangborn and her associates at the New York State Department of Health laboratory in 1942 caused great interest among those engaged in the serodiagnosis of syphilis In 1943 a protective patent was effected in order to ensure the purity of cardiolipin manufactured in the U.S.A The resulting supervisory work soon proved too much for the laboratory and W H O was requested to take over the international control of the reagent The W H O subcommittee on serology and laboratory aspects of venereal diseases[1] suggested that technical information on the isolation purification, and standardisation of cardiolipin and lecithin should be made available to major laboratories all over the world and W H O aims to control cardiolipin by the establishment of international standards. The organisation's Expert Committees on Biological Standards and on the Unification of Pharmacopœias together with the serological subcommittee, is now engaged on this work and cardiolipin antigens of guaranteed chemical purity and tested serological activity should soon be obtainable by all laboratories which need them

As part of this campaign, W H O have issued a monograph,[2] by Pangborn and her associates which should be of great help to all concerned with serology in venereal disease

The first section deals with the preparation and the chemical examination of cardiolipin and lecithin; the various techniques are described in detail but concisely The second section deals with the serological examination of cardiolipin antigens used in the Wassermann reaction and the microscopic slide-test techniques of the New York State Department of Health; this part would have been of greater value if the methods used in arriving at the formulæ of the antigens had been described in detail. It is however noteworthy that statistical methods have been applied to the results of the serological examination of batches of antigen submitted for investigation as to suitability for use in routine tests. Here again while a brief account is given of the direct probability sequential analysis there is no guide to the reasons why certain limiting figures are adopted. No doubt these deficiencies will be remedied in further editions

Cardiolipin antigens have been applied to innumerable Wassermann and precipitation techniques. It is possible therefore that W H O will feel it desirable to issue short monographs describing the serological standardisation and use of cardiolipin antigens as applied to well known and internationally accepted techniques of assessing these reactions Most serologists agree that cardiolipin antigens are more sensitive and specific in the detection of syphilitic reagin than the ox heart extract antigens generally used Work in this country[3] seems to support this view and now that cardiolipin is to be had more attention might be given to the merits of this reagent

NUTRITIONAL SURVEYS

IN his Statistical Account of Scotland (1791–99) Sir John Sinclair aimed at portraying the living conditions of the Scottish people and his description showed, among other things, that their dietary had vastly improved during the eighteenth century Sir John's great grandson Dr Hugh Sinclair in giving his Cutter lecture on preventive medicine[4] must have contemplated wistfully the confidence with which his ancestor took nutrition in his stride as one of many interests Increased knowledge improved technique, and the continuing search for accuracy bring with them a heavy sense of scientific responsibility

Dr Sinclair's lecture shows a deep knowledge of the history of his subject His views are built out of ten years intensive research with the Oxford Nutrition Survey which was born in the critical days of early 1941 With the support of the central authorities and financial help from the Rockefeller Foundation the team began with family studies; they then coöperated with V P Sydenstricker in rapid clinical surveys consisting essentially in an inspection of skin hair tongue and mucous membrane of the mouth a slit lamp examination of the cornea and scleral conjunctiva and recording of certain data about the teeth Sydenstricker's technique had been developed to meet conditions in certain southern States of the U S A. and it was valuable here in war-time because it reassured us that the grosser manifestations of malnutrition were absent The Oxford unit also carried out large scale analyses of blood-samples obtained through the transfusion services which gave a rough but useful gauge of the national trends in hæmoglobin protein vitamin A, and ascorbic acid levels. At the end of the war the unit turned its attention to European problems, studying the conditions resulting from acute famine in the Netherlands and chronic malnutrition in Germany

Survey work of this kind if it is to serve its administrative purpose of influencing food policy and bringing relief when and where it is most needed must be carried through rapidly During the war this aim was achieved by teams consisting of a clinician a biochemist, a dietist a technician and a clerk; and a specially designed Hollerith punch-card was used These methods, valuable as they were are insufficient for peace time research and since the war there has been a great refinement in technique Now the purpose of the survey is to define the cause severity and distribution of nutritional defects and this can be accomplished only by the careful assessment of individuals. There are no short cuts The search for cause must take account of the fact that deficiency of any of several nutrients can produce the same clinical signs, and of the more puzzling finding that combined lesions produced by combined deficiencies may be very different from the sum of the lesions ascribed to the individual deficiencies The study of severity must also take into account duration of deficiency, since short errors are more easily corrected than those of long duration In addition, the pitfalls of sampling are many, as the European survey showed .

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[1] W H O Technical Report Series no 33 Geneva and H.M. Stationery Office 1951; p. 19

[2] Cardiolipin Antigens By MARY C PANGBORN F MALTANER, A N TOMPKINS T. BEECHER, W R. THOMPSON and MARY R FLYNN W H O Monograph Series, no 6 Geneva and H M Stationery Office 1951

[3] Price I N O, Wilkinson, A E. *Lancet*, 1950 i, 14

[4] Sinclair H. M *New Engl. J Med* 1951 245 39

> “In one study in the Netherlands houses were chosen on a sound statistical basis and all occupants were asked to attend a clinic Had the apparent refusals not been followed up, the worst cases of malnutriture would have been missed because no person was unwilling to attend but some were too ill to do so When attending a committee in Germany I was shown the results of a nutritional survey in a certain town and was surprised at the gloomy picture presented. I was assured by the medical officer in charge that they were correct I asked about the sampling and was shown the letter of instructions sent to the Oberburgermeister I spoke to him, and he told me that as the army authorities were making a nutritional survey he supposed they would like to see cases of malnutrition, so he sent them as the sample those persons who were to be given extra rations on the grounds of malnutrition. In another town, I watched a street corner weight survey carried out by an allied sergeant with two GIs and a German interpreter with scales and measuring rod at a busy street junction. Here nothing but the errors was random The GIs selected the pretty girls, the interpreter (and the onlookers) discouraged fat Germans and pushed forward thin ones, the bright-eyed healthy streetwalkers came up to see what was going on and were weighed, the listless malnourished passed by on the other side, the worst were at home in bed”

In the second part of his lecture Dr Sinclair considers the place of nutritional surveys in the university and in the field Nutritional science, he holds, should be regarded as a branch of experimental science, and is fundamental in its application to man, or as supplemented by animal experiment, and its aim is to advance knowledge for its own sake On the other hand, the application of scientific knowledge to man in his environment is important, but it is not a proper subject for a university Between these two lies the field survey—for example, “to determine the needs of the population for health in terms of the more important nutrients”[5] The function of these surveys is useful to science, but limited in scope A university institute of human nutrition is of course entitled to pursue any method that will further its research, but it is not to be bound by the survey method, which is essentially a function of the Ministry of Health and other public authorities.

PREGNANCY AND RHEUMATOID ARTHRITIS

ONE of the observations that led Hench and Kendall to predict that rheumatoid arthritis was not incurable was remission of the disease during pregnancy In pregnancy some “substance X” in the blood must, they argued, cause the rheumatoid inflammation to abate, and in their search for this “substance X”, cortisone was discovered Kendall[6] believes that the two are identical or closely related Nevertheless there are anomalies active rheumatic fever, for example, occurs during pregnancy and may be notably severe[7], yet the symptoms of this disease are alleviated by cortisone On the other hand, Wolfson et al[8] have reported a case where allergic symptoms were regularly abolished by pregnancy but were unaffected by cortisone

In 1947 Barsi[9] claimed some success in imitating pregnancy remissions by transfusions of blood from pregnant women to rheumatoid arthritics Lately Granirer[10] has described the successful use for this purpose of postpartum plasma—i.e, plasma from blood withdrawn from mothers twenty four hours after delivery This material, given in weekly doses of up to 250 ml can he claims, cause gradual and sustained, though not always complete, improvement. His gain weight and feel better, their arthritis and such abnormalities of the blood as anæmia reversed albumin/globulin ratio return to normal. T sedimentation rate, however, does not improve —a fact which emphasises that this treatment equivalent to cortisone therapy. Moreover reports that seven patients refractory to cor responded to postpartum plasma.

In an attempt to explain the action of plasma Granirer has assayed it for A.C.T.H. activity, the Sayers adrenal ascorbic-acid depletion test. He shown that it is active by this test; even after of storage at 5°C about one third of the original activity remained Control plasma from women contained no A.C.T.H This result presents us with a problem, for the remissions produced by partum plasma do not have all the features of those evoked by A.C.T.H., and the doses of plasma would be equivalent to about 0 5 mg of A.C.T.H. Moreover other workers, such as Parrott,[11] have that the A.C.T.H. activity of drawn blood is very transient, its almost immediate breakdown be prevented only by special precautions postpartum plasma contains a stable form of A.C.T.H or possibly it contains a new factor which itself destroy the normal A.C.T.H.-removing mechanism, in the way that acetylcholine is potentiated by esterases. If so, do these substances originate the maternal or the fœtal pituitary gland, or are elaborated by the placenta? Jailer and Knowlton reported the case of a woman with Addison's whose need for adrenal-cortical hormones during pregnancy—presumably because of secretions. Can the placenta also produc T.H.?

ANTIBACTERIAL EFFECT OF CO MILK

THE antibacterial action of cow's milk w covered 1894, but at first little work was don it. antibacterial substance, which Jones[13] call was found to have a bacteriostatic rathe n a bac tericidal action, only the most sensitive the organisms, *Streptococcus pyogenes*, was ac and then only when present in small numbers S *coccus agalactiæ*, the organism causing bovine mas was inhibited for a few hours, after which it multip rapidly Jones found lactenin in the whey, where could be concentrated by dialysis since it did pass through semi-permeable membranes An alcoh precipitated active fraction was obtained from th concentrate, but was not chemically pure. No bett method of concentration has yet been described.

Lactenin may be present in the milk when it is absen from the blood,[13 14] and presumably it is synthesised in the mammary gland It withstands heating to 60°C for 20 minutes and is thus unlikely to be a serologically active compound Similarly it is not an antibody Human milk is rich in lysozyme, which may possi account for most of its antibacterial activity; lactenin is unlikely to be identical with lysozy since only very little of the latter is found in cow's milk, Jones thought that lactenin played a part in resistanc of the mammary gland to infection, and Foley and Lee tried to explain the sudden appearance of bovine mastiti in terms of the development of lactenin resistant strains Jones and others also suggested that lactenin helps to prevent milk-borne epidemics due to *Strep* *pyogenes* More recently, however, McEwen and White have confirmed that lactenin occurs to about the sam extent in udders with and without infection Moreover when they produced an artificial mastitis by infusing cultures of *Strep. agalactiæ* the lactenin titre of the milk was not altered; and thus doubt was thrown on the hypothesis that lactenin accounts for the resistance of the udder to infection. The recent work of Wilson and Rosenblum[18] is therefore of special interest. These workers show that lactenin acts only in an aerobic medium, and that anaerobic conditions and the presence of reducing agents like cysteine and glutathione abolish its inhibitory action. Catalase has no "anti-lactenin" effect. They have further shown that milk removed from the udder by catheter is in a reduced condition, because it quickly decolorises methylene blue. Wilson and Rosenblum suggest that in the udder lactenin is inactive.

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[5] U N Conference on Food and Agriculture Hot Springs 1943

[6] Kendall E C See *Lancet*, 1951 ii 586

[7] McKeown F F *J Obstet. Gynæc.* 1948 55 50

[8] Wolfson W Q, Robinson, W D, Duff I F *J clin Endocrinol* 1951 11, 793

[9] Barsi I *Brit med J* 1947 ii 252

[10] Granirer L W *J Amer med. Ass* 1951, 146 995

[11] Parrott, D See *Lancet*, 1951 i 1212

[12] Jailer J W, Knowlton, A I *J clin. Invest* 1950, 29, 1430

[13] Jones, F S *J exp Med* 1928 47, 877

[14] Chambers W H *J Bact* 1920, 5 527

[15] Thompson, R. *Arch Path* 1940, 30, 1096

[16] Foley E. J, Lee S W *Cornell Vet* 1948, 38 307

[17] McEwen, A. D, White, M B *Vet Rec* 1950, 62, 97

Nevertheless the rôle of lactenin or other anti-bacterial substances in the mammary gland cannot be lightly dismissed. For instance Neave et al.[19] have shown that the cow is more susceptible to infection in the dry period than during lactation; and work now proceeding at the National Institute for Research in Dairying has revealed that in the dry period the anti-bacterial power of the secretion is low, the normal inhibitory activity returning in the colostrum on about the 2nd day post partum. There is good evidence too that the inhibitory properties of early colostrum and of milk are due to different substances. Finally it is known that the rate of growth of the milk streptococcus—*Strep. lactis*—is subject to seasonal variations. This organism is not susceptible to the inhibitory substances in milk,[20] and variations in the concentration of growth-stimulating substances might explain the seasonal changes. From an epidemiological viewpoint these growth-stimulating substances may be more important than the inhibitory substances.

THOUGHTS FOR INVESTIGATORS

Ramon y Cajal was wont to give his students a series of paternal admonitions on how to cultivate the scientific method. For the first time these have been translated into English,[21] and though they include many reflections on the then depressed state of scholarship in Spain, they also contain much that is of general interest and aphorisms that will stand the test of time.

To pursue scientific investigation, says Cajal, is one of the most worthy and laudable of undertakings, for perhaps more than any other career it is permeated with the fragrance of universal love and charity. How much better, he says, to apply ambition in this way rather than in the army or in art, seeking the easy applause of the multitude who understand beauty much better than the truth. The scientist's statue has love for a pedestal and his triumphs defy the desecrations of time and the judgments of history. Indeed, as he contemplates his problems of Nature, he comes near to the ideal of Henry James, of becoming a collaborator with God.

There are no small problems; those which seem so are large ones not properly understood. To observe without thinking is as bad as to think without observing, and no fact need ever be considered too insignificant, for the minutiæ of today may be important truths tomorrow.

Analysing the qualities that can make or mar the young scientist, Cajal lists the indispensable attributes of the research worker as mental independence, intellectual curiosity, perseverance, devotion to country, and a desire for reputation. The young man entering this field must beware of remaining too attached to his teacher. "How many of keen intellect we know," he adds, "who have had no greater misfortune than to have been pupils of a great man. Extreme admiration drains the personality and clouds the understanding." Defect for defect, Cajal prefers arrogance to diffidence, for whereas boldness measures its forces and conquers or is conquered, excessive modesty flies from the battle and is condemned to shameful inactivity. Besides, modesty is sometimes a mask for indolence. Many habitually mistake for incapacity a simple slowness in understanding and learning, and at times even indolence or the lack of some secondary quality such as patience, thoroughness, and steadfastness—attributes which can be acquired quickly with the habit of work and with the satisfaction of success. Deficiencies of innate aptitude may be compensated for through persistent work and attention. Work in fact substitutes for talent and even creates it, while the spirit is as capable of being educated as is the intelligence.

Cajal has sound advice to offer to those face to face with a scientific problem. Consider the problem by itself, he says, without deviating to secondary themes, the pursuit of which, by dissipating our attention, lessens our analytical forces:

> Let us put aside unnecessary pursuits and those parasitic ideas connected with the futile trifles of life, fixing solely in our minds, aided by persistent attention, the data pertinent to the problem that concerns us. Expectant earnest attention is not enough: it is necessary to reach total absorption. It is important to put to use all of our lucid moments, be it in meditation which follows prolonged rest or in the super-intensive mental work which only the nerve cell heated by congestion can produce, or finally in unforeseen intuition which frequently flies out, like a spark of steel from the impact of scientific discussion."

He urges the research worker to cultivate the faculty of "cerebral polarisation" or chronic attention, orienting all faculties, if needs be for months or years, towards the single object for study. "Infinite in number," he adds, "are the brilliant minds that through lack of this attribute are rendered sterile in their meditations." When setting out on a problem—and we need never hesitate to strike out from somebody else's discovery—it is best to have before one all the bibliographical antecedents, or, as Cajal puts it, "to resort to a plebiscite of the learned." Human brains, he maintains, like desert palms, pollinate themselves at a distance. But let us never forget that while we may learn a great deal from books we gather more in the "contemplation of Nature—the reason and occasion for all books."

Though theories may be dangerous for the beginner, the working hypothesis is an essential part of an investigation, since it constitutes an interpretative questioning of Nature. If the hypothesis is a much abused weapon it is also an instrument of logic without which not even observation itself, by its very nature passive, can be realised. Nevertheless, hypotheses pass but facts remain; and while theories desert us facts defend us; they are the true resources of the scientist and are at once his real estate and his pedigree. In the writing of the paper which follows his research and hypothesis, he will constantly aspire to reflect object reality with the serenity and candour of a mirror, drawing with words as the painter with his brush, forsaking in short the pretension of the stylist and the fatuous ostentation of philosophic depth. Above all he will resist the impulse to be premature, for "the desire to arrive first induces us at times to become shallow." If attacked, we must be prepared to defend ourselves; but when the sword is unsheathed let the tip be adorned with a bouquet of flowers.

In his review of illustrious failures in the realm of scientific endeavour he includes dilettantes or contemplators, the megalophiles, the instrument addicts, the misfits, and the constructors of theories. Many fall by the way because the mind is not pliable enough

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[18] Wilson, A. T., Rosenblum, H. *J. exp. Med.* 1952, 95, 39.

[19] Neave, F. K., Dodd, F. H., Henriques, E. *J. Dairy Res.* 1950, 17, 37.

[20] Morris, C. S., Edwards, M. A. *Ibid*, 1949, 16, 101.

[21] Precepts and Counsels on Scientific Investigation: Stimulants of the Spirit. By S. RAMON Y CAJAL. Translated by J. M. Sanchez-Perez, M.D. Edited and annotated by Cyril B. Courville, M.D. Mountain View, California: Pacific Press Publishing Association. 1951. Pp. 180.

"Like unmoulded steel," he writes, "our intellect represents a potential sword Thanks to the forging and polishing of study it is transformed into the tempered and keen scalpel of science," And then he adds "Let us have a cutting edge only on one side or on two at the most if we wish to conserve its analytical efficaciousness and penetrate to the heart of problems and let us leave to the scatterbrained adherents of encyclopedism the privilege of transferring their mentalities into dull weapons" Excessive attachments to one's own ideas must be avoided, so we must be our own prosecutor rather than our own attorney "The worship of inflexibility or resistance to change, which in politics passes for virtue," he says, "in science is almost always an unmistakable sign of pride or shortsightedness" Plasticity implies youthful vigour, whereas inflexibility presages senescence Finally, the successful scientist must renovate himself materially and mentally many times throughout his life; "for," says Cajal, "there are many different incarnations which come almost to interrupt the continuity of consciousness and the sensation of one's own personality New reading and the change of one's ethical and intellectual environment continually alter and improve the atmosphere within, besides clarifying and refining the judgement"

OPINIONS ON THE CHARGES

OUTSIDE the field of politics the new charges in the National Health Service[1] (on which we have already commented[2]) have been accepted fairly calmly, perhaps because they were expected. Discussion has centred mainly on the best means of averting undue hardship The *Times*,[3] for example, questions whether reimbursement should be limited to patients with incomes below the subsistence minimum standard of National Assistance

The charge which perhaps threatens the greatest inequity is that on prescriptions The *Pharmaceutical Journal*[4] asks whether this charge will delay the patient's calling on the doctor, with consequential danger to individual and national health, while the *British Medical Journal*[5] suggests that it will tell especially hard on old-age pensioners and on patients with long and serious illness The *British Medical Journal*, observing that some patients are importunate in their demands for medicines and cotton-wool, says that "doctors are ready to educate their patients out of the bottle-of-medicine habit if given half a chance", and on p 364 of this issue Dr Barrow claims that the prescription charge will cause patients to buy "patent" medicines, and argues that the road to true economy lies in the direction of health education and the construction of health centres. The *Times* says, on the other hand, that the charge is necessary as a temporary expedient, but adds "Fundamentally, it is the circumstances of the doctor, who alone can give a prescription, not of the patient who expects (or is thought to expect) a prescription, that need changing" The General Medical Services Committee has expressed the view that the prescription charge "will inevitably introduce a financial barrier between doctors and those who need their services", and it urges that doctors should not be required to play any part in the actual collection of the money

The *Times* also holds that the new dental charges will fail to secure more treatment for the priority groups; eventually, it suggests, the school and the main dental service will have to be fused, with free treatment for priority patients and part payment by the rest The council of the British Dental Association has declared that the requirement that all except the exempted shall pay the whole cost up to £1 will penalise patients seeking regular treatment, and encourage neglect of dental health, and the absence of exemption for those requiring treatment for the relief of pain will cause and suffering". The association urges that the for young people should be extended to all up to 21, and that all those who are not exempt should percentage charge, with a maximum of £4 5s

SIR ALLEN DALEY RETIRES

A BRILLIANT and influential career comes to an offi end with Sir Allen Daley's retirement next week from his post of medical officer of health and school medica officer of the County of London.

Daley succeeded his father as M O.H for Bootle in 1911, and came to London, by way of Blackburn and Hull, in 1929 Placed in charge, under Sir Frederick Menzies, of the very extensive public health work of the department, he also played an important part in the taking over by the L C C of the 76 hospitals, with 40,000 beds, administered by the boards of guardians and the Metropolitan Asylums Board. The welding of these hospitals into an efficient municipal service was an immense undertaking, but it was largely accomplished before the outbreak of the second world war. Daley acted as chairman of departmental committees concerned with pathological services, hospital standards, hospital staffing, the district medical service, the ambulance service, and the tuberculosis scheme, and the reports of these committees influenced policy outside London as well as within L C C borders Promoted deputy in 1938, he succeeded Menzies as county medical officer in 1939 The L C C's mental-hospital service was placed under his administration in 1941 and he then became head of the biggest municipal hospital service in the world Its part in serving the civilian sick and the air-raid casualties of London, despite the heavy bomb damage its buildings sustained in some 660 incidents, enabled it later to say that no acute case of illness and no casualty ever failed to get a bed in an L C C hospital. In 1944 Daley's distinguished services were recognised by the bestowal of a knighthood

The ending of the war plunged Sir Allen into the problems of reconstructing the hospital service and preparing for the National Health Service In London these problems were peculiarly complex. Not only had the L C C's staffs, records, and hospitals to be handed over to four separate regional hospital boards and several boards of governors of teaching hospitals, but the maternity and child-welfare services of the 28 Metropolitan boroughs and the City had to be taken over and integrated with the remaining health services of the L C C The smooth accomplishment of both tasks owed much to Daley's administrative genius This period also saw his energies and abilities utilised in wider spheres As president, and then for four years as chairman of council, of the Society of Medical Officers of Health, he occupied the leading position in the counsels of his own branch of the profession. He also occupied an ex officio seat on the Central Health Services Council, sat on many of its standing advisory committees, and was chairman of that on mental health Many voluntary bodies sought his assistance, and as older statesman he befriended and guided many of his junior colleagues.

Blessed with good health, an astonishing capacity for work, an excellent memory, an abiding interest in men and things, and the saving grace of humour, Daley has served his day and generation well, but has still much to give us Like Sir Arthur Newsholme, before him, he goes for a few months to America, where, at the instance of his friend Dr Huntington Williams, he will act as part-time associate health officer of the City of Baltimore and will also lecture in several American universities. On his return there will certainly be no lack of employment for his wisdom and experience, and we speak for hundreds of his friends in the medical and nursing professions in wishing him many fruitful years of healthy, happy, and energetic retirement.

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[1] *Lancet* Feb 2 1952, p 267
[2] Leading article *Ibid* p 247
[3] Leading article *Times*, Feb 6, 1952
[4] *Pharm. J* Feb 9 1952 p 86
[5] Leading article, *Brit med J* Feb 9, 1952 p 312

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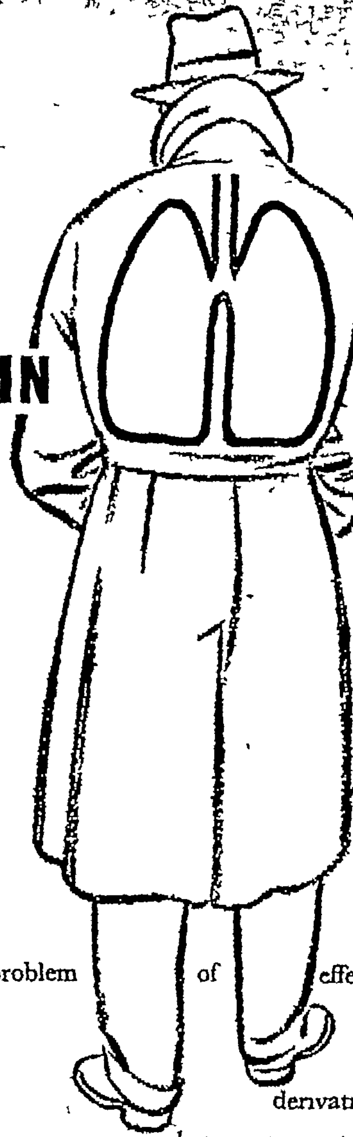

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The Wider World

THE NATIONAL HEALTH SERVICE OF DENMARK*

JOHANNES FRANDSEN
M.D Copenhagen
DIRECTOR-GENERAL, DANISH HEALTH SERVICE

PUBLIC HEALTH services all over the world have a common purpose—the treatment of the sick, the prevention of disease, and the promotion of health But their administration differs from country to country, for it depends on the social structure and economic strength of each community Like other legislation public-health legislation bears its own national stamp and has its own historical background Because the tubercle bacillus looks the same all over the world, and because infection is spread by the same routes in northern and southern hemispheres, we cannot assume that the fight against tuberculosis can be conducted according to one universal international plan But since our common purpose is to find the best methods for conducting public health activities according to local needs and circumstances we should probably all benefit by learning something of public health administration in other countries. May I tell you how we order these things in Denmark ?

THE DANISH WAY

Denmark has no ministry of health. A short-lived attempt at creating such a ministry towards the end of the 20s made it clear that Denmark is too small to benefit from this kind of administrative machine Nor is a department with general charge of health incorporated in any of the existing ministries Instead the various branches of public health are administered by the different ministries concerned and by the local authorities, and the money voted for public health is provided by both central and local budgets

The local authorities own and manage the hospitals, appoint their own health committees are mostly responsible for food inspection maintain the tuberculosis dispensaries, and look after child health The cost of these services is met from local taxes, but the central government makes refunds of varying size fixed by law

As the central department for local government, the ministry of the interior is responsible for many parts of the health services, and it therefore seemed to be the appropriate ministry to be given general charge of the national health service, when this was created. But other ministries also take a hand in public health The ministry of social affairs is in charge of sickness insurance, factory legislation industrial health and other social legislation The ministry of agriculture administers many parts of the food inspection service though the Food Control Act itself comes under the ministry of the interior The ministry of education is responsible for the school medical service as well as the university hospital (the Rigs hospital) at Copenhagen Indeed all the ministries touch on public-health work at some point. Even the ministry of ecclesiastical affairs has medical advice on the planning of cemeteries.

With such scattered public health administration there is a danger of diffusion of energy overlapping and lack of organised planning Obviously a coördinating medical body is necessary In Denmark, as I have said we have tried to achieve this without a ministry of health and without a ministerial health department Outside these departmental services but closely associated with the different sections we therefore set up in 1909 a central institution of public health—our National Health Service.

HOW THE DANISH N H.S WORKS

Our health service supervises public health and nursing including dental surgery, midwifery, and pharmacy advises the public in all matters requiring a knowledge of medicine or drugs. The various departments of the central administration also consult it The service is responsible for health and nursing in the army and navy, the university hospital and Greenland.

The service watches the state of the public health closely sees that public health legislation is observed draws the attention of local authorities to infringements and defects, considers suggestions from authorities or organisations, and submits recommendations for improvement The service also offers guidance on special health measures. It supervises all State and local hospitals and private nursing homes. Plans for new buildings or for extensive alterations to hospitals must be submitted to the service Private homes also require the permission of the minister of the interior for building or extensions.

All doctors, dentists, midwives, nurses, pharmacists, masseurs, and other auxiliary workers are under the authority of the service and it must be consulted before appointments are made to medical posts at hospitals and elsewhere

The head of the national health service the director general, must be a doctor but he is not allowed to practise On the service's staff are doctors lawyers, nurses, and pharmacists. The service has its own department of medical statistics. Consultants are linked with the service by their membership of the scientific board on which the different specialties are represented Other members of this board include an active general practitioner and a dental surgeon Important State institutions which come under the health service include the State Serum Institute, the State Institute of Hygiene the Pharmaceutical Council and the Control Laboratory for drugs and medical preparations

Another important branch of our national health service is the corps of county and district medical officers. Their relationship with county council, town council, and rural council is like that of the national health service and the government They are the local representatives of the service with the same mandates vis-à vis the local authorities, and they are also members of the local health and epidemiological committees. Through these officials—and of course by direct discussions with local councils when necessary—we are always in touch with every aspect of public health all over the country Besides being doctors, these health officers who are appointed by the Crown must have spent three months in an epidemiological department three months in a psychiatric department and three months in general practice They also take a four month course in public health at a university But apart from this obligatory training preference is given to candidates with the widest experience of clinical medicine Private practice is allowed so long as it does not interfere with their official duties Though this permission may occasionally be abused, I believe that the health officer's continued contact with practical medicine is of value to his official work It also enhances his prestige among the nonmedical members of the health committee who might otherwise be inclined to regard him as a superior clerk.

EXPANSION OF THE HOSPITALS

In 1932 an amending Act was passed to bring the service into line with modern needs. At that time the most important task facing the service was the development of the hospital system

About 1930 this problem was laid before a gathering of representatives from all over the country with the suggestion that each county should build one or perhaps two, central hospitals. For a start each would have at least three departments—surgical, medical, and radiological—and to which more special departments would be added as might be desirable and financially expedient Despite the delays of the war, this object was attained during the next 15 years Each county now has at least one central hospital, as well as a number of smaller hospitals, each with 50–100 beds, in the charge of a surgeon

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* From a lecture entitled The Development of the Health Services in Denmark, delivered to the Irish Academy of Medicine on Nov 5 1951 The lecture will appear in full in the *Irish Journal of Medical Science*

The area of Denmark is 42,900 sq km and the population in 1950 was 4,300,000 We now have 5 medical surgical beds and 0 6 infectious diseases beds per 1000 of the population. For tuberculosis we have 1 bed per 1000 and for mental diseases 2 5 beds Taking all the different kinds of hospitals together we have 10 4 beds per 1000 inhabitants

The present difficult financial position, which we can scarcely expect to improve in the near future, makes the further improvement of our hospital system less easy We shall still have to make the fullest use of the smaller hospitals—including some which ought to be closed But in Denmark distances are such that it will be possible to turn the hospital system of each county into one organic whole, with the central hospital as the pivot

The central hospital system is supplemented by special hospitals As they receive their patients from wide areas they are outside the framework of the county hospital system and are run wholly or partly on behalf of the State For example, we have two departments for neurosurgery and hope to open two more There are three radiotherapy departments, built and run by the National Cancer Society with State subsidies There are also two hospitals for orthopædic patients, which are private institutions but are maintained by the State

Our hospitals for mental diseases were the first part of the health service to be placed under central administration, though the City of Copenhagen still administers its own, for which it receives a State subsidy These hospitals are due for extensive modernisation, but this will require so much money that it must proceed slowly

GENERAL PRACTICE

The hospitals are only one side of the treatment of disease, though it is the more conspicuous and most expensive Treating the sick outside the hospital in their own homes and in the doctor's consulting-room is the other side

If we are to improve our hospital system and keep it abreast of medical progress, it is essential for financial reasons to take care that the hospitals do not grow bigger and treat more patients than is necessary We must see that family doctors are used to the full in the service of healing by helping them to get all the laboratory tests and specialist examinations they need in order to treat as many patients at home as possible In Denmark we have about 2500 well-trained general practitioners, and it would be poor economy not to see that they were fully employed treating the sick The work of the hospital must be carried outside its walls to the practitioners by means of laboratory tests, X ray examinations, and so on This difficult problem can be solved only by amicable coöperation between medical and non-medical hospital authorities and the organisations of the medical profession A beginning has been made, and most of the central hospitals now have laboratories which undertake investigations for general practitioners

TUBERCULOSIS

Parallel with the reorganisation of the hospitals, the local authorities, at the suggestion of the national health service, began to open municipal tuberculosis dispensaries In each county a dispensary system was established, with a tuberculosis hospital as the centre and its chief physician as the director of both the hospital and the dispensary work Consultations are held at clinics in different parts of the county, and each is staffed by a tuberculosis trained nurse These dispensaries cover both urban and rural areas Under the provisions of the Tuberculosis Act, half of the cost running the dispensaries is refunded by the State. Th work was completed in 10 or 15 years, and Denmark now has long been covered by tuberculosis dispensaries.

Tuberculosis in Denmark is retreating so rapidly that we shall soon have to consider the possibility of using some of the tuberculosis institutions for something else Dispensary work, keeping a check on the population, and maintaining the B C G immunisation which is now general throughout the country, will then be the chief task The dispensaries will remain as vigilant sentries in this watch service, always with the valuable support of the National Society for Combating Tuberculosis Under the direction of this society an examination of the entire population is now being carried out, with B C G immunisation for those who react negatively These examinations, which will be finished during 1952, have uncovered no surprises in the form of concealed cases of tuberculosis, so our statistics rest on the bes possible foundation The death rate for all forms of tuberculosis was 78 per 100,000 in 1927 (2710 deaths), and 14 in 1950 (588 deaths)

At the same time as tuberculosis dispensaries were being opened, the Federation of Danish Dairy Organisations was carrying out a widespread campaign against bovine tuberculosis, with the result that Denmark is now completely rid of that type of tuberculosis This organisation has spent large sums on hygiene, both in the cow-byre itself and in every branch of food prod tion that depends upon it Foot and mouth dise which sometimes also attacks man, can now be broug under control by immunisation, and contagious abortio among cattle is being fought energetically.

PREVENTIVE MEDICINE AMONG CHILDREN

Another important piece of preventive work began with a six-year experiment to see whether the high infant mortality could be reduced by employing health nurses These nurses visited the homes and taught the mothers how to look after their newborn children in the first postnatal year The experiment was made in three districts, two rural and one in a Copenhagen slum It was financed in equal shares by the Rockefeller Foundation and the local authorities From the outset the health nurses were welcomed by the people, more than 90% of whom opened their doors to them The results were so good—infant mortality in the selected districts dropped to half—that an Act extending the work was quickly passed This allows local authorities a State refund of half the cost of employing health nurses on such work The Act was a turning point in Danish health legislation, for it was the first law aimed at preserving the health of healthy people

Besides their ordinary training, health nurses must take a year's postgraduate course at the university at Aarhus This course was planned by the national health service and the Rockefeller Foundation, and for the first four years was financed by the foundation and the Danish life insurance companies Afterwards the State took it over For the first few years after the Act was passed we could not train enough health nurses to meet the demand Then the war came and hindered the scheme, so we still have not enough nurses to cover the whole country About 300 of them are now employed, and a third of these work in rural areas More than half the children in Denmark are now under the regular supervision of a health nurse

Since 1945 preventive health legislation has been extended to expectant mothers and school-children Now every expectant mother has the right during her pregnancy to be examined three times by her doctor and seven times by her midwife In their first year children have the right to three medical examinations, besides the advice and supervision of a health nurse From then till they go to school at the age of 6, healthy children are examined once a year Their health up to the ordinary school leaving age of 14–15 is then the charge of the school doctor

These free routine examinations are offered to all children, regardless of their social standing Before starting school the children are examined by the local practitioner usually the family doctor The fee for this is fixed by the State in consultation with the Danish Medical Association: half is paid by the State and half by the local authority In the early days of this school service many general practitioners were chosen as school doctors In future they will be required to pass a special course, but this has not yet been started

Another valuable piece of health legislation arose from a small epidemic of malignant diphtheria during the war This condition had not been diagnosed in Denmark for many years, but this epidemic gave us an opportunity to introduce diphtheria immunisation Now, by the Act of 1943 everybody under 18 years of age can be immunised against diphtheria free of charge This immunisation is carried out by the doctors for a fee fixed by the ministry of the interior after consultation with the Danish Medical Association and the whole cost is borne by the State Widespread propaganda backed by the fear of an epidemic made it possible to get almost the whole population immunised and the infectious-diseases hospitals emptied of diphtheria patients in a short time For the future, all that remains is to maintain the interest in immunisation The fever hospitals are now being taken over for other purposes and replaced by small isolation wards Economically, the diphtheria campaign was a good investment, and the public-health service otherwise known for its expensive demands, secured a good trump card by publicising the saving of money by preventive measures.

FREE WILL AND GOOD WILL

Diphtheria and B C G immunisation are offered to all free of charge. The community is so vitally—and financially—*interested in the campaign against these diseases* that it naturally pays the whole cost This principle was also accepted for the services offered to expectant mothers and children Protection against disease is thus offered to all free of charge Acceptance of this help is voluntary, but parents who refuse to have their children examined by the school doctor must send the school a certificate from their family doctor that he has examined the child Compulsory measures may sometimes be necessary in public health but they ought to be exceptional.

We need the good will of the people for our work. That is why the help of the local councils in running the hospital system in housing inspection in food control and so on is so important, and why the local health committees are so valuable These committees are appointed by the popularly elected councils and the elected element is in a decided majority especially in the rural areas. They are sometimes not very active. From time to time we receive suggestions from idealistically minded professional men that they should be replaced, wholly or partly by eminent, zealous specialists, doctors fully trained in hygiene, engineers, with preferably a policeman in the rear—or in the van—as the case may be Undoubtedly splendid results are obtainable with the aid of such expert and powerful teams armed with orders and regulations and fines or other penalties. But we should then lose the chance of training the lay helpers who on the long view are necessary to obtain solid lasting results.

Besides the health officer who is ex officio a member the health committee has specialists associated with it as officials. In the course of this coöperation on council and committee between the elected representatives of the people and the hygiene experts of the public health administration, we secure an ever growing body of informed lay helpers

In the last 10 years our preventive legislation has created a large new medical field. The question was naturally raised how this work could be done most efficiently and economically It was suggested that it would be cheaper, and technically perhaps more effective, to carry out diphtheria immunisation by sending out teams of young doctors and nurses. It was also considered whether it would not be advisable to appoint pædiatricians to examine the children

These suggestions could not be dismissed as worthless or as impracticable Indeed, it might have been cheaper to adopt them. But we had no doubt that the newly created medical work belonged by right to the general practitioner

In any public-health service it is imperative to use the practitioner s knowledge and energy to the full If you push him aside and deprive him not only of the work but also of the chance of earning something first in one field and then in another the result will be a disillusioned hard up profession and an impecunious doctor who has lost courage and who cannot afford to keep his medical knowledge abreast of the times is apt to be both dangerous and costly to society On the other hand a public-health service that turns the general practitioners into interested collaborators, not only in treating the sick but also in the work of preventing disease and of promoting health, will have added greatly to its own strength

Medicine and the Law

Death after Dental Extraction

LAST July at Nottingham assizes a widow was awarded £4500 damages for the loss of her husband and £50 in respect of his pain and suffering the defendants being Dr X and the Chesterfield Royal Hospital A Chesterfield dentist, the late Mr J W Slack, had also been sued; but the jury found that he was not negligent

The widow's husband died in the hospital after 10 teeth had been extracted The jury found that Dr X and the hospital were negligent the doctor being 70% responsible. They also found, however that there had been contributory negligence on the part of the deceased After argument on these findings, Mr Justice Hallett gave effect to the jury s view that the dead man had contributed 50% to his own death The learned judge therefore awarded the widow the £50 above mentioned and a sum of £2250 the latter sum to be paid in the proportions of 70% and 30% by Dr X and the hospital.

The litigation had in some respects run a curious course. The defendant hospital had not pleaded contributory negligence and thus was in difficulties over benefiting by the jury s finding in that respect. Mention was made during the hearing of a suggestion that the deceased and his wife might have been aware that the patient was unable to take certain chemotherapeutic tablets and that one or other of them should have informed the defendants of that important fact The actual finding of contributory negligence was based on the fact that the patient took only eight of the tablets supplied to him He was it seems unable to swallow more

On appeal [1] the finding of contributory negligence in this respect was upset. Lord Justice Somervell and his two colleagues failed to see that the deceased had been at fault. A patient who has just had 10 teeth extracted might not be able to swallow normally Accordingly the judgment awarded to the widow has been restored to the full sum fixed by the jury instead of the £4500 being halved. Dr X will have to contribute 70% in accordance with the jury s finding

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[1] *Nottingham Guardian*, Jan 24 1952; *Derbyshire Times* Jan. 25 1952.

Special Articles

MEDICINE WITHIN THE ATLANTIC COMMUNITY*

A P MEIKLEJOHN
D M , B Sc Oxfd, M R C P
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THE cultural contacts that used to exist between American and European medicine have become so tenuous in recent years that some Americans feel that they might as well be severed altogether This professional chauvinism has an explanation, yet it is a blow to any hopes of cultural harmony within the Atlantic community If medicine, with its universal concern with humanity, cannot maintain itself in the currency of international thought, what hope is there for the other intellectual disciplines, which together form the basis of Western civilisation ?

CHANNELS OF COMMUNICATION

Let us consider, one by one, the existing channels for the flow of medical thought across the Atlantic

Reading Each Other's Publications

Fortunately library facilities are now fairly good in the main medical centres on both sides, but the circulation of at least one new British journal among American libraries is, to my personal knowledge, a fraction of what it should be Apparently some librarians now see little sense in subscribing to new journals from abroad

The reader of publications from overseas does not always know how to evaluate them To the reader, the author is usually nothing but a name—certainly not a colleague So, although his paper is read and his ideas are almost unconsciously assimilated, it does not always seem necessary to refer to the original source of the ideas, when the reader himself comes to write about the same subject This grave tendency to use the ideas of foreigners without acknowledgment is apparent in both British and American literature It creates ill feeling on either side and prevents international intellectual harmony It would not happen—at least not so often—if the two authors were personally acquainted

Exchange Lecturers

Some distinguished doctors are invited back and forth across the Atlantic each year to tell of their contributions to medical science They are invited because they are distinguished , from which it is obvious that they have spent long, industrious years in the laboratory—more rarely, the hospital—and are now weary Many of them are old and some are retired Though the formal presentation of their accumulated wisdom is helpful to their audiences, they seldom have time, or indeed inclination, to talk to the younger men personally—to learn something from them in return They say their piece and depart to a formal dinner with the heads of the university

Official Delegates

A small number of doctors, officially representing their country or one of its institutions, travel back and forth to meetings of W H O , W M A , F A O , defence meetings, university centenaries, and the like Intellectual exchanges are rare on such occasions The young are excluded

International Conferences

The International Physiological Conference in Copenhagen last year provided me with the first opportunity since the war of seeing in Europe any reasonable num of my American friends and contemporaries But th were relatively few, and nearly all in physiology—n medicine There has been no medical conference of th same kind to bring my clinical friends over Internation Hæmatology at Cambridge was too narrow

Hospital Exchanges

Johns Hopkins and Guy's Hospital have had a long standing arrangement of temporary exchanges of staff which fortunately continues The chair of surgery at the Peter Brent Brigham (Harvard) invites temporary British tenants St Mary's Hospital (London) is about to begin an exchange of a junior staff member with the Children's Hospital (Boston) These are the only examples known to me of such an excellent arrangement

The War

A number of American doctors were over in Britain during the late war (a Harvard unit early in 1941). Though some personal contacts were made, there was not much time for a free exchange of ideas just then

Travelling Fellowships

East to West—The happy days when Sir Joseph Barcroft went freely to America to coöperate with American physiologists on the assault on Pyke's Peak are long since departed Then there were easy personal contacts between medical scientists on both sides of the Atlantic, aided a good deal by the colossus of Sir William Osler, with one foot in Baltimore and one in Oxford. Even up to 1939, a considerable number of young, excited but unknown British doctors found their way across the Atlantic, either on travelling fellowships or, quite often, on their own resources These men now form the nucleus of the Horseshoe Club in Britain During the late war, a few medical students enjoyed the hospitality of American medical schools through the far sighted generosity of the Rockefeller Foundation

Since the war, the flow of young British doctors visiting America has been reduced to a mere trickle The fellowships provided by the Nuffield, Rockefeller, and Commonwealth Foundations are so few that many young men must feel that it is futile to apply for them Other travelling scholarships, in the gift of universities, mostly still offer their prewar stipend, on which a man can no longer live, even if it could be converted to dollars , for example, the M'Cunn travelling scholarships from Edinburgh University are advertised in the 1951-52 University Calendar as providing £100 " for such period less than a year as the trustees may approve " No young doctor can go, as in the past, on his own resources, because he is not allowed to convert his pounds to dollars

Thus it was that in three months' travel through medical centres in the States, I met only three young British doctors I met more Danes Except for the tiny minority, the iron curtain of financial restriction has cut us off from the leading centres of medical thought in the Western world

West to East—Since Osler's time, the flow from west to east has been thin This is because the best young American doctors are usually unable to get away Many come from poor homes and must make money , many are married and that makes it worse , competition is so keen at home that they must be around when the plum job comes up , there are almost no travelling fellowships which they have any hope of winning , and, to our shame, their chiefs often see no sense in gaining experience outside America

The late war prevented those who had wanted to come to Britain from doing so One of Hitler's successes was to widen the gulf between American and British medicine

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* A previous article also based on a report to the Nuffield Foundation, appeared on Jan. 5, 1952, p 45

It should be realised that the future of American edicine is no longer in the hands of the international gures, now aged 50 and up whom we were used to eing about at international conferences before the war he American principle is early ripe and early rot" you are not a professor of medicine before you are 40 ou've had it. On the age group 35–45 the best of resent thinking and the direction of future policy rgely depends The numbers in this group who have ver been outside the U.S.A.—except to endure boredom U.S army messes round the world during the war— re microscopic. Yet I think there can be no doubt that any of these men would welcome a chance to visit ritain, now that they have established jobs and if they ere financially helped to do so

WHAT CAN BE DONE?

I hope that I am right in seeing this as a bad situation at needs something done about it Knowing nothing the administrative problems involved, I would evertheless like to suggest

East to West.—There is a shortage of young medical search workers in the U.S.A. just now The men of gistrar status who would normally have joined a search unit for a year or two before going into practice, re now called up by the army Research units generally re short of such men, whereas we have plenty with onourable military records. Several people I met said hat they would welcome a British doctor to fill their acant post and would pay him a fellowship salary The nly trouble seems to be, to get him across the Atlantic ossibly the Fulbright Fund could help in this.

West to East.—There are first-rate young doctors in merica who would like to visit us but they do not now who would welcome them here because neither hey nor their friends have ever been over Also most f them are married so it would have to be made nancially possible for them to bring their families ossibly again, the Fulbright Fund could help Alternavely it would be a great advantage if the National ealth Service would consent to pay visiting American octors a salary equivalent to that of their British ontemporaries. One reason why some young American octors are loth to apply for jobs over here is that work British hospitals does not count for the purpose of he three years work in an approved' hospital, now ecessary before they can qualify to sit for their oards—the equivalent of our M.R.C.P and F.R.C.S he Board of Internal Medicine in the States at present pproves for this purpose only one British hospital —Hammersmith This is manifestly absurd, and based n ignorance of our institutions. I feel sure that if some esponsible body like the members committee of the oyal College of Physicians were to furnish the board ith a proper approved list, it would be accepted, and his barrier would be removed.

The few exchanges of doctors that now take place are usually arranged privately a professor on one side of he Atlantic writes to an old friend on the other asking if he could find room for one of his young men if he can win a travelling fellowship When the answer is Sorry full up this year he may then write to another; but soon he gives up because he has run out of personal contacts, and anyway it involves so much time and letter-writing I know of one such recent instance where a young *American who wanted to pay for himself for a* year in Britain was unable to make the necessary contacts. It should be emphasised moreover that as the older men come to retire, the number of people who are able to make such personal contacts, through friends on the other side, is steadily diminishing

On the one hand there are medical departments, on both sides, that would welcome a visitor and could (sometimes) pay him a salary on the other there are men who would welcome the opportunity but do not know where the openings lie What is needed is some system for bringing the two together

SCOTTISH ADVISORY COMMITTEES

THE *Secretary of State for Scotland* has *appointed* new members to the standing advisory committees of the National Health Service in place of those who retired on Dec 31, 1951 and has reappointed other members whose term of office expired on that date Medical members have been appointed or reappointed as follows

Dental Advisory Committee—Dr Russell Logan (Edinburgh) reappointed.

Nursing and Midwifery Advisory Committee—Dr J Hewitt, F.R.C.O.G. (Glasgow) appointed

Pharmaceutical Advisory Committee—Dr A. Smith Pool (Glasgow) appointed

Standing Advisory Committee on Health Services in the Highlands and Islands—Dr Thomas Scott (Inverness), appointed; Dr Angus Lamont (Foyers Inverness) re appointed.

Public Health

TUBERCULOSIS IN SCHOOL ENTRANTS

AND THE INVESTIGATION OF ADULT CONTACTS

W E PARKES
M.D Belf., D.C.H.
FORMERLY PÆDIATRIC REGISTRAR, ROYAL HOSPITAL, WOLVERHAMPTON

RECENTLY a tuberculin jelly test has been applied to all school entrants in Wolverhampton Last year we decided that all the children who were tuberculin positive should have a full clinical examination, including estimation of the erythrocyte sedimentation rate (E.S.R.) where necessary and chest radiography at the Royal Hospital Wolverhampton The county borough of Wolverhampton has a population of about 162 000 people, of whom 25 000 are of school age Each year there are about 3000 new school entrants In 1948 and 1949 2% of these gave positive results to the tuberculin jelly tests. In 1950 the refinement was adopted of first abrading the skin with fine sand paper before applying the jelly In this series 6% gave positive results (table I) This method was described by Dean* (1946) who suggested that it gave results about equal to those of the 1 in 1000 Mantoux test.

TABLE I—RESULTS OF TUBERCULIN JELLY TESTS IN SCHOOL ENTRANTS

Year	No tested	Positive reactors
1948	3028	63 (2·08%)
1949	2965	60 (2·02%)
1950	2913	183 (6·28%)

HOME VISITS

Later arrangements were made to have the homes of some of these positive reactors visited by the almoner and her staff so that the problem could be explained to the parents and they could be reassured. We hoped that useful information about contacts and home conditions might be obtained

Of 183 tuberculin positive children only 125 attended for clinical and radiographic examination at the hospital

TABLE II—TYPES OF HOUSES IN WHICH TUBERCULIN POSITIVE CHILDREN LIVED

Old houses	19
Pre-war council houses	43
New council houses	15
Prefabricated bungalow-type houses	3
Privately owned modern houses	20
Total	100

* 13 with no bathroom.

The almoner visited the homes of 100 of those, chosen at random, and the results are summarised in tables II and III The standard of housing was reasonably good, and overcrowding seemed to be below the average for this densely populated and heavily industrialised area. So far as cleanliness and equipment were concerned, the homes of 75 were good, 18 fair, and 7 poor Wolverhampton has multiple and varied light-engineering projects, and there is virtually no unemployment Wages are comparatively high, therefore, even in houses with considerable overcrowding, there always seemed to be enough to eat No case of actual want was discovered in this series

TABLE III—NUMBER OF CHILDREN IN FAMILIES VISITED BY ALMONERS

Only child	2	3	4	5	6	7	8	9	10
13	39	22	10	5	5	2	1	2	1

The almoners found the parents coöperative, although rather a high proportion of adults refused to attend for radiography, mainly because of the inconvenience and, one suspects, through fear that a lesion might be detected Mothercraft appeared to be good or reasonably satisfactory in 91 cases and bad in 7 cases, and the remaining 2 children were looked after by neighbours

RADIOLOGICAL FINDINGS

The results of chest radiography in the 100 children whose homes were visited by the almoners are summarised in table IV. There was evidence of active, healing, or healed tuberculosis in the X-ray films of 29 of these children, and in 16 cases the adult contact was known—i.e , the mother in 4 cases, the father in 3 cases, the sister in 1 case, an aunt in 3 cases, and a neighbour in 5 cases 4 unsuspected cases of adult pulmonary tuberculosis were found. In 2 of these the child's mother had an exudative type of lesion for which sanatorium treatment was required Another mother had an early pulmonary lesion The fourth adult case was the sister of one of the children She appeared to have a quiescent Assmann's focus In the case of 9 children with a healed primary complex an adult tuberculous contact could not be found, and 6 children with clear chest X-ray films were reported to have been in contact with adult cases of pulmonary tuberculosis Contact with sputum-positive adults was neither known nor discovered in the investigation of the remaining 65 children whose chests were radiographically clear

TABLE IV—RESULTS OF CHEST X-RAY FILMS OF TUBERCULIN-POSITIVE SCHOOL ENTRANTS

Active primary complex	Probably healing primary complex	Apparently healed primary complex	Clear chest
1	10	18	71

MASS RADIOGRAPHY SURVEY

Recent examination of a second, smaller, group of school entrants revealed 48 tuberculin-positive children The father of 5 of these was confined to bed at his home with pulmonary tuberculosis The children were therefore seen at the hospital, and 2 were found to have active primary tuberculous complexes requiring rest in bed

In the previous survey there was inevitably a long waiting period for radiography at the hospital X-ray department and in spite of reassurance many parents became unduly worried. It was decided that the Wolverhampton Mass Radiography Unit should be radiograph these tuberculin-positive children many child and adult contacts as possible. The health department arranged that the parents should interviewed by the health visitors, so that the objects the investigation could be fully explained to Forty positive reactors attended and, by chance, of them were boys and 20 girls The radiography radiographed these children and 64 child and contacts. Only 2, probably quiescent, cases pulmonary tuberculosis were discovered in this These will be followed up by the unit. 9 of the had doubtful miniature films. On further with large X-ray films and E.S.R. estimations 4 considered to have active and 8 healed complexes

A much higher proportion of adult contacts for radiography in this survey, probably because were assured that there would be practically no delay this instance circumstances decreed that a p should be chosen for the mass-radiography However, we felt that the best attendance would obtained if the women and children were asked to on a morning or afternoon, and the men in the after normal working hours

DISCUSSION

Although both of these series are much too small be statistically significant, they revealed 3, or 4, unsuspected cases of active adult pulmonary losis and 36 cases of active, healing, or healed tuberculous complexes in the children During two years 19 children with tuberculous meningitis age-group 0–15 years were admitted to W hospitals from within the county-borough area, and these, 14 were aged less than 6 years Hospital is long and costly At least 2 of the children are now deaf In view of the suffering involved, steps should taken to reduce the incidence of this complication ensuring adequate rest for all children with activ healing primary tuberculous complexes, and by gating all children, especially if negative reactors, from sputum-positive adult cases

A logical extension of this work would be the perhaps half-yearly, tuberculin-testing of all child from an early age, starting at the child-welfare clin The need for this is emphasised by the large number cases of tuberculous meningitis in children aged less 6 years. As soon as Mantoux conversion occurs their contacts, especially their parents, should be graphed A mass radiography unit can deal with about 500 persons in a day, and one should try to obtain large a number of contacts as possible, so that the may not be idle for part of the day

Dick and Thompson (1946) approached the of childhood tuberculosis from a different aspect, in they tuberculin tested the child contacts of adult of active pulmonary tuberculosis They radiographed the positive reactors and found that a high proportion new cases fell into the age group 0–4 years

The intradermal Mantoux test was not used in search for positive tuberculin reactors Deane (1946) suggested that the method used in this series g similar results, whereas Dick (1950) considered th flour-paper was more satisfactory than fine sand pape The work of Lendrum (1951) supported the view th the flour paper technique was better However, Clark (1951) found that, without previous abrasion of the skin, tuberculin jelly (Allen & Hanburys) gave results identical with those obtained when 0 1 ml of a 1 : 1000 dilution of Old Tuberculin was injected intradermally One can therefore assume that these tests are equally effective, and the jelly test is undoubtedly the method of choice

The visits paid by the almoners and health visitors to the homes of these children were very helpful. As the health visitors work in well defined areas and are known in many of the homes they seem to be the proper people to contact the parents.

In the initial survey 125 children were examined clinically before being radiographed It was soon apparent as is well known, that signs of primary complexes were virtually non-existent and that those with suggestive symptoms often had radiologically clear chests. These routine examinations took up a considerable amount of time, and the subsequent large chest radiographs made heavy demands on the available hospital radiographers and films. These objections were all overcome by the examination of positive reactors and their contacts by mass radiography The miniature chest films were of a very high standard but, if there was the slightest suggestion of a lung lesion, a large radiograph was taken Several independent observers were of the opinion that little, if any chest pathology was missed in this second small series. However it is obviously desirable that a much larger survey should be undertaken to assess this point, especially in toddlers.

SUMMARY

A tuberculin jelly test was applied to almost 3000 children entering school for the first time, and 6 26% were found to be positive reactors. Of these, 125 were examined clinically, and the homes of 100 were visited by the almoners. From these 100 cases at least 3 unsuspected cases of active pulmonary tuberculosis were discovered among the adult contacts and 11 apparently active or healing primary tuberculous complexes were found among the children

These investigations would have been much simplified if, as in the second group all positive reactors and their child and adult contacts had first been radiographed by the mass radiography unit, which seemed to be an efficient filter in the search for active pulmonary tuberculosis among tuberculin positive school entrants and their adult contacts.

However, it is suggested that an investigation large enough to be statistically significant should be undertaken to verify the impression that few lung lesions are missed on mass radiography films in school-children Younger children present a more difficult problem whether large or miniature chest films are taken So far as liability to tuberculous infection is concerned, they seem to be a far more important age group than the school-children

A plea is made for the frequent routine mass radiography of recently converted tuberculin positive children and their adult contacts in an attempt to reduce the incidence of childhood pulmonary and meningeal tuberculosis. Chest radiographs of mothers especially should reveal unsuspected cases of adult tuberculosis, because the fathers will often have been radiographed at their place of work

It is again emphasised that more facilities are required for the separation of children from adults with active pulmonary tuberculosis

I wish to thank Dr Bertram Sergeant, senior assistant school medical officer Wolverhampton, who organised the tuberculin testing of the children Dr T F McCarthy medical director of the *Wolverhampton Mass Radiography* Unit; Miss E M. Fox, M.A., head almoner Royal Hospital, Wolverhampton, for allowing me to cite the results of the almoners work; and especially Dr H. Everley Jones, who suggested the investigation, for his constant encouragement and advice

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Parliament

Dentists Bill

In the House of Lords on Feb 5, Lord Woolton, Lord President of the Council, moved the second reading of this Bill which he described as granting the dentists the status and dignity of a self governing profession; regulating the admission of foreign and Commonwealth dentists to the Dental Register; and providing for the training of ancillary dental workers. The debate centred round this last provision

In view of our urgent need for more dentists and of the success of ancillary dental workers in New Zealand it was not surprising, Lord Woolton thought, that the Government should consider whether similar workers could be used in this country The Bill however did not empower the G D C to introduce these workers straightway, or indeed at all until an experimental scheme had been tried Their two year training would include the extraction and filling of teeth, and after the first batch of ancillaries had been employed for a year the G D C would report on the results of the experiment. Only then would the G D C be able, in conjunction with the Privy Council to draft regulations to establish a class of ancillary workers. Thus the initiative in this matter would lie with the G.D C, a large majority of whose members were dentists

Lord Teviot was uneasy about the introduction of ancillary workers. He believed the charges for dentures would reduce the strain on the dental services, and he felt it was more important that children's teeth should be attended to by a dental surgeon than those of adults. Lord Webb Johnson was in favour of encouraging the training of dental nurses provided that the limits of their activities were narrower than were at present laid down in the Bill They should not, in his view, be permitted to interfere with living tissues Any attempt to train dental ancillaries to undertake extractions and fillings was bound to encroach on the facilities for training dentists. Lord Amulree supported the employment of oral hygienists to undertake scaling, cleaning, and polishing not only in the public service the Armed Services, or the *National Health Service*, but also in private practice. He felt, however, that extractions and fillings were a major task to give to the unqualified

Lord Haden Guest believed that in present circumstances some form of ancillary workers was essential to get dental work done for children. We were threatened with a generation of children with neglected teeth.

The Earl of Onslow, replying for the Government, pointed out that the word 'nurse' could not be used in describing a dental ancillary because of the protection it enjoyed under other Acts of Parliament. The task of evolving a suitable name for the dental ancillary would be left to the G D C We must face the fact that there were not nearly enough dentists, and that there was no hope of securing them in the foreseeable future Obviously something must be done and surely the aim should be to obtain the greatest good for the greatest number rather than complete dental treatment for a restricted number If what was proposed came to pass it would be entirely erroneous to call the dental ancillaries either untrained or a partly trained They would in fact be highly trained in one particular aspect of the dental profession.

QUESTION TIME

Hearing aids and Wigs

Replying to Dr A D D Broughton Mr H. F C Crookshank, Minister of Health, said that the free issues of hearing-aids and wigs to National Health Service patients during 1951 were 03 454 and 9750 respectively and the estimated cost excluding overheads was £320 000 and £124 000

In England Now

A Running Commentary by Peripatetic Correspondents

FROM our window we look up towards the Strand, the way taken so often by kings Never were the crowds so thick and quiet. A movement like wind in a cornfield, as men bared their heads, heralded the little cortège—a few police, the team of Royal Horse Artillery in hussar uniform and busbies, and then, suddenly and briefly, the gun-carriage, the brilliant yellow of the Royal Standard, a wreath of flowers, a crown. The royal dukes, walking close behind it, were followed at a little distance by members of the King's household, taking him from his home to Westminster Hall the centre of this realm

Was ever procession more impressive? A few men walking behind a gun-carriage on a dull day through the dull streets of London A silent multitude. But on the coffin three superb symbols—the banner of history, the crown of majesty, and the flowers of affection.

* * *

The first people to enter Westminster Hall on Tuesday morning were in time to see the last watch of the night relieved First came three Gentlemen-at-Arms, their slow steps matched by the ringing of their spurs They were followed by four Yeomen of the Guard in the familiar red uniform, to replace their comrades who had stood through the cold night muffled in dark cloaks Lastly, four officers of the Coldstream Guards, wearing heavy bearskins, entered at a slow march, swords raised in their right hands As the new guard took up their place round the catafalque the old one silently moved away The officers slowly lowered their swords, folded both hands on the hilt, bowed their heads, and began their vigil.

* * *

It was a cold, clear morning, the north-west wind fluttering the Royal Standard at half-mast above Westminster Hall and stinging our eyes as we gathered in the queue that stretched nearly from Lambeth Bridge We were a crowd representative of all His late Majesty's subjects—solid men in bowler hats and black ties, housewives, typists, a group of African students, two demure nuns, a country clergyman with rosy cheeks, an old lady walking with a stick. Strange to think that a week ago on a clear sunshiny day like this the King had been out shooting at Sandringham for the last time

We moved steadily along, talking to our neighbours, and after about twenty minutes were ascending the steps into Westminster Hall where the column split in two, proceeding more slowly down from the entrance into the vast hall, its grey stone flags carpeted in grey, with the red-carpeted dais in the centre on which stood the purple-shrouded catafalque, draped with the Royal Standard Six tall candles glowed on the dais, at the four corners of which stood sentries of the King's Bodyguard in their Tudor costumes facing outwards, their heads bowed and leaning on their partisans Closer to the bier stood the four officers of the Household Brigade, in full-dress uniform, resting on their reversed swords On the coffin gleamed the jewelled Crown, Orb, and Sceptre and at the head rested the white wreath of the Queen Mother, with her signature Elizabeth legible on the card from the distance at which we passed. The gorgeously apparelled Gentlemen-at-Arms bowed their plumed helmets over their long staves The sun came glinting through the high windows under the lofty roof as we passed silently by, turning and lingering as we got to the far end of the hall to store up the impression of a poignant and historic occasion

Magnificent and awesome in its setting and pomp, yet the King's Lying-in-State will remain, for those of us who saw it, a supreme example of the simplicity of our constitutional monarchy In death as in life the King was accessible to us, and we felt part of the family of which he was the beloved Head

"I wouldn't have missed it for worlds," said my neighbour, a burly Yorkshireman, as we issued into New Palace Yard and he replaced his trilby "It's times like this that make this country great Ee, well, now I must go and do some work."

Letters to the Editor

NEEDS AND MEANS

SIR,—In your leading article of Feb 2 you say "The charge of a shilling for each prescription is much more than a token charge, and is probably worth trial on its merits as a means of discouraging demands for medicines" This means that you are tent to ally the medical profession with a stop, which attacks one of the best features of the service—namely, that at the time of need there shall financial barrier to medical treatment—and also you tacitly accept the implication that the is unable to control excessive and un prescribing

There can be few general practitioners who can this point of view Even the old National Insurance system made no financial imposition at time of need, and if the issue of form E C 10 is curtailed by the imposition of a charge, this will simply mean the public has resorted to patent medicines—not that has stopped swallowing medicine For many years have been telling patients to come to the doctor have their ailments diagnosed before they are but the charge for prescriptions will encourage to go to the chemist This particularly applies to children

If the medical profession are unable to resist the "excessive demands for medicines"—which may true in some cases—this is because the element is still present in general practice and is under the capitation system of payment, and also of the failure of the medical profession to educate public on health matters I believe that the will not remove either of these two pathological ditions, which are in the main responsible for symptomatic "generosity" of the general More money should be spent on the services, including health education and health this would lead to true economy

Birmingham

M BARROW.

SIR,—Those aware of the lack of financial marg old-age pensioners, war pensioners, and recipient National Assistance will be concerned by the prop new charges in the National Health Service Refunds will be obtainable by war pensioners recipients of National Assistance, but one wonders fr what source they will obtain the initial outlay Fro wide experience I can state that many tuberculo persons, for example, have few friends able to advan financial aid It would be interesting to know why old-age pensioners are not eligible even for the refund My work brings me into direct touch with this section of the population, and many are living in near-poverty It seems that those most in need are to be deprived of the benefits of the health service

London S.W 6

E D ANDREWS

CAT-SCRATCH FEVER

SIR,—I hasten to take up the challenge in your annot tion last week Even the usually phlegmatic cat of London have been known to turn against mistresses, and we have recently treated a case of this disease here

The child, who is under Prof. Alan Moncrieff's care, showed the typical features you describe, together with erythema nodosum, which has also been observed in other published cases. By the courtesy of Prof. P. Mollaret, who supplied the antigen, we have been able to confirm the diagnosis by the specific skin test well as by biopsy of the primary lesion ; and a full account of the case will shortly be published

The Hospital for Sick Children
Great Ormond Street,
London W C 1

P J N Cox
Medical Registrar

SIR,—The following case seems to fit the description in your annotation

A woman, aged 42 attended the medical clinic here in November last year On Nov 7 a kitten had scratched her scalp above the right ear ; 3 days later she noticed some swelling in the right side of her neck ; and 10 days later her right upper cervical glands were quite grossly enlarged painful and tender At that time she had 11 000 white blood-cells per c.mm., of which 60% were lymphocytes. The glands decreased in size and a month later were barely palpable

St. James' Hospital,
London, S W 12

R D Wigley

THE TREATMENT OF PEPTIC ULCER

SIR,—May I congratulate Dr Doll and Dr Pygott on their article of Jan 26 in which they advance evidence not a priori speculation about the effect of certain factors on the healing of gastric ulcers Thereby they were able to demonstrate that phenobarbitone and ascorbic acid are useless. Although they were unable to reach definite conclusions about rest strictly supervised diet, and the psychological effect of being in hospital at least one of these factors appeared to have some influence, since the progress of their patients in hospital was significantly (though not strikingly) better than that of those on an ambulant régime It should be noted however that even if say rest had been proved to quicken the rate of healing of ulcers that would not justify its routine advocacy Only evidence that rest will prevent future relapses, or that it is harmful in the long run to advise it merely for those patients who fail to progress satisfactorily when ambulant, would warrant that conclusion.

Dr Avery Jones (Feb 9) evidently does not share my view that the onus of proof should rest upon the advocates of remedies, since he says that the traditional treatment of peptic ulcer ' should not be discarded until evidence has been obtained against it He also attaches great weight to the collective experience of the ulcer population ' But did not similar collective experience ' in other fields apparently confirm in the past the almost universal bleeding purging, and starving and in the treatment of bleeding peptic ulcer the giving of nothing by mouth except a few sips of ice-cold water ? Does Dr Avery Jones suggest that our ancestors would have been wrong in discarding these remedies because no one had produced evidence of their uselessness or harmful effects, derived from controlled therapeutic trials ?

Dr Avery Jones touches on wider issues when he says that in his article on peptic ulcer from a general practitioner series (which I quoted) he naturally set out the orthodox views Undoubtedly in such series it is a common practice to advocate remedies for no other reason than that they are traditional In consequence, one may still read that a brisk purge, pushing fluids a light bland diet, eradicating septic foci and attention to the general health are essential " that tonics should be exhibited faulty habits of living corrected, and strain avoided Recently general practitioners were even informed that in the treatment of alopecia areata, ' altering the patient s rhythm of existence, rest *and the administration of bromides and phenobarbitone* are often justifiable and, in the treatment of essential hypertension accompanying obesity ' a careful programme of watching and waiting is probably the best solution Yet those who write in this way may be sharply critical when discussing the merits of some new antibiotic, and give precise reasons for their statements Why should not editors of medical journals insist that the same critical analysis be made of the general and well-established remedies ? And why should general practitioners be regarded not as intelligent men who desire a constructive discussion of the value of all therapeutic measures, but as simple creatures who deserve only a series of ex-cathedra pronouncements from some high authority ?

Farnham Surrey

John W Todd

HICCUP DURING ANÆSTHESIA

SIR,—Dr Fajardo s remedy (Feb 2) for this annoying condition—the intravenous injection of 20 mg of ' Methedrine —is most interesting and will doubtless be tried by anæsthetists in Britain But while his method takes three minutes to restore tranquillity, the inhalation of the vapour from an ampoule of amyl nitrite will have the desired effect in thirty seconds. The side-effect of his method is hypertension of amyl nitrite it is hypotension which is without ill effect

If the circuit in use is semi-closed, the gauze-covered ampoule is introduced into the corrugated tubing the gases turned off the expiratory valve closed and the ampoule broken. Its vapour is helped on its way into the lungs by gentle manual assistance of respiration. With the closed circuit the soda lime should be switched off before the ampoule is broken and should remain out of circuit for a short while afterwards. In each of ten consecutive cases the method—for which I claim no originality—has been successful

In my experience, hiccup though most common in upper abdominal operations, is not confined to this type of case.

Westcliff-on-Sea
Essex.

J Alfred Lee.

SIR,—*I was much interested to read Dr Fajardo s* observations but I differ from some of his conclusions.

A year or two ago in a series of 67 gastrectomies for which I anæsthetised the patients, I noted 18 cases of hiccup all of which occurred with a particular surgeon who performed 25 of these operations. In the remaining 42 cases (where operations were performed by five other surgeons) I cannot recall a single instance of hiccup The surgeon whose patients tended to develop hiccup during the operation did a more extensive resection than the others, and during the operation exerted great traction upon the œsophagus ; when hiccup did occur its onset was always heralded by this particular manipulation

The onset of hiccup (as in Dr Fajardo s experience) *was unrelated to the level or depth of anæsthesia ; but,* unlike Dr Fajardo I found nothing that would control it. On the other hand, about 10 minutes after traction and excessive manipulation had ceased the hiccup could be readily controlled by various means. I would not class hiccup of this type with the more distressing variety that persists for many days after operation The former type is caused by manipulation and rough handling and tends to disappear when the trauma ceases. Thus any drug or combination of drugs which appears to alleviate the anæsthetic ' type of hiccup probably plays a minor part, since the attack would in any case soon disappear Protracted postoperative hiccup, on the other hand, is not on the wane when treatment is instigated

Acton Hospital
London, W 3

J Tobin
Anæsthetic Registrar,
Central Middlesex Group of Hospitals

SIR —Dr Fajardo s letter raises several points :

1 Although I have noted hiccup during upper abdominal operations, it has, in my experience been considerably more common immediately after induction of anæsthesia with intravenous thiopentone ; and though rhythmic its rhythm

has been unrelated to that of the respiration It has invariably passed off within 5–10 minutes, during which period the effect of the agent used for maintenance is being established and the secondary redistribution of the thiopentone is occurring This observation suggests a correlation between the onset of hiccup and the initial high concentration of thiopentone in the central nervous system

2 Hiccup during upper abdominal surgery would seem to be dealt with rationally by administering further doses of the appropriate relaxant to the point of respiratory arrest, and thereafter instituting controlled respiration, for there is doubt about the afferent pathways concerned in the reflex, but not about the efferent

3 Leaving aside the arguments with which Dr Fajardo supports his use of methedrine in the treatment of hiccup, it appears to me that 20 mg intravenously in a single dose is too much A few years ago I used to inject 15–30 mg of methedrine *intramuscularly* to prevent hypotension during spinal analgesia, and commonly I observed gross hyper tension and tachycardia, and sometimes even multiple extra systoles, following its administration More recently I have used it to raise the blood pressure on completion of operations performed during "total spinal" analgesia, or for patients under the influence of hexamethonium bromide, and have found that an average dose of 5 mg produces a satisfactory response, while sometimes 2 mg has sufficed. In view of these observations, I think it likely that the injection of 20 mg of methedrine intravenously may produce undesirable effects on the cardiovascular system, and will certainly obscure the circulatory effects of blood loss and their response to treatment

Carlisle

D HUNTER SMITH

THE RIGHT TO KNOW A RISK

SIR,—Your annotation last week raises a very important problem for the whole medical profession In my opinion, should your line of thought be accepted medical and surgical activity would very soon be reduced to urgent life-saving procedures

When a man of middle age comes to me with, say, a large inguinal hernia, I explain carefully to him why he should have an operation his condition is bound to become disabling, and there is a risk of strangulation with all its dangers But at the same time shall I also explain that whatever anæsthesia he has, and even if it is given by an expert, he may die of it, the chance of doing so being 1 in 2000 ? Shall I explain to him that, although his chest is clear, he may develop massive collapse of the lung, of which also he may die ? Shall I explain to him that the risk of his developing phlebo thrombosis and having a fatal pulmonary embolus is 1 in 600 ? Shall we abdominal surgeons tell all our patients that their very lives will depend on a single knot or stitch ?

If all the possible risks in medicine or surgery had always been carefully explained to the layman (who, more often than not, is in no position to understand) surely Jenner would not have vaccinated his first patient, Pasteur would not have tried his anti rabies inoculation, and mankind would probably be still without penicillin and blood-transfusion

I think that the right attitude for the medical man, who alone can know the possible risks, is for him to ask himself before taking a decision "If I was suffering from that patient's disease, would I accept the diagnostic investigation, treatment, or operation I am about to tell him he must have ?" When a patient can feel that his medical advisor (whether general practitioner or specialist) takes such a view, he will give him his unbounded confidence and accept whatever treatment is advised

It must not be forgotten—in the matter of venereal or pestilential diseases, for instance—that one person's undue fear of a very small risk may imperil countless others

Brussels

J LIMBOSCH

INFECTION IN HOSPITAL

SIR,—Several points in the letter from Miss Edw (Jan 5) should be answered

Although the memoranda on nursing procedures w circulated by the Ministry of Health, it was on the adv given to the Minister by the Nursing Advisory Committe This committee must, therefore, take some responsibility for their content

Might the committee also perhaps, in their capacity as advisers, have given constructive suggestions with regard to the distribution of the memoranda ? These were sent to hospital management committees and boards of governors, which were asked to consider the suitability of the memoranda on certain nursing techniques "adapted primarily for the needs of nurses on broad general lines." There is no machinery for ensuring representation of nurses on these boards and committees, and yet it is suggested that at the discretion of these bodies the leaflets could be issued to the trained nursing staff "as they stand or adapted." Could there be any greater imposition on the nursing profession ?

A careful reader of our letter of Dec 15 would, we think, realise that rigid uniformity was the last thing that we desired or advocated. The very fact that we recommended "a progressive attitude" as being "neces sary in those practising a living science under widely differing conditions" should have allayed any anxiety on this score We have supported in the nursing press the policy of setting up procedure committees to avoid the rigidity which must result from central control

The point made by Miss Edwards with regard to interviewing visitors shows clearly the difference between theory round the conference table and practice in the wards Perhaps few who have not recently worked in hospital realise the difficulties with which the ward sister is faced today Staffs are being reduced, the turnover of patients is becoming more rapid, and the number of treatments each patient receives has increased In addition most hospital patients are allowed visitors daily It is impossible to envisage how, with the heavy evening work, time could be found to interview visitors before they enter the ward Visitors have spent time and money to come to the hospital, where, on most days of the week, they have only a brief half hour with the patient If, when the influx comes, some are detained for instruction on cross infection, this is likely to be ill received

The potential carriers of infection mentioned in the memoranda are medical, nursing, and domestic staff, patients' visitors, and official visitors, of whom chapl and librarians are specifically named Official visi also include medical students, clerical, technical, and staffs, and social service workers, which makes problem even greater

Is it possible that advice to patients' visitors on the dangers of cross-infection, with emphasis on the common cold, might be included in the instructions issued to patients before admission, reinforced possibly by the display of notices in the waiting halls ? A second con structive suggestion is that any memoranda bearing on nursing matters that are issued in future to administra tive bodies should also be forwarded in toto to the hospital matrons

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ECONOMY IN X RAY FILM

SIR,—I enjoyed reading Mr Downie's spirited letter (Feb 2) on the seemingly pathetic inadequacies of diagnosis without special aids in general and Professor Röntgen's piercing eye in particular

He truly says that special aids are designed to reveal evidences of disease to the visual sense But his theme, I fear has run away with him and has led him to an extravagant proposition The eye to him, is the only diagnostic instrument of any value What wantonness is this that would lightly scatter the humbler senses to the four winds? They may have taste for all the use it is in diagnosis, but let us rescue the remaining three Does not the ear, on occasion tell us all we need to know about the activity of the bowel or the movement of air in the lung? And smell—why even this primitive sense may influence the choice of an antibiotic till the pus is thoroughly if relatively slowly investigated by refined visual methods. But the senses that reside in the hands surely these are not to be carried away in the holocaust? No-one doubts, for example, when the necessity for operation for a swelling in the breast is in question that the eye, however reinforced, is no match for the hand; again, no instrument is so perfect as the hand for quickly recognising small differences of temperature over large areas of skin

Perhaps, Sir your correspondent occasionally casts a regretful eye (evidently it would have to be an eye) on the time he wastes at the bedside when he is not, in awful silence and with hands folded in front of him, engaged solely in gazing intently at his patient.

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BREAST-FEEDING AND DIET

SIR,—In their letter last week Dr Walker Miss Arvidsson and Mr Draper draw attention to the wide difference between the theoretical dietary requirements of lactating mothers and the minimal diets which appear to be compatible with successful lactation They mention that they have made many analyses of the milk of Bantu women and raise the question of a biological assay of the nutritive value of the milk It is very much to be hoped that the figures of their analyses will be published so that they can be compared in detail with those of other workers. In particular information is needed of the composition and total quantity of milk secreted and of the actual amount of food taken habitually by poorly nourished mothers with sustained lactation Might I suggest that the intake of breast milk by babies with satisfactory weight gain might be a better measure of the nutritive value of the milk than the assessment of the "biological value from the weight gain of rats? Judging by clinical experience there is reason to believe that a baby uses human milk more economically than cow's milk, and there may well be better usage by the young of each species of the milk proper to it Dr Walker and his colleagues almost imply defiance by the lactating mother of the law of conservation of matter They mention the Bantu woman's freedom from osteomalacia despite her small intake and large output of calcium If she is indeed in positive calcium balance, or only slightly in negative while in full lactation one must assume that with a small intake of calcium absorption is, by Western standards highly efficient Presumably irradiation of the skin ensures this.

The counterpart of the African picture is the failure of lactation among some Western women who are convinced or greatly fear that their diet is insufficient for adequate lactation This psychogenic effect has been observed in some women whose diet was adequate by all but their own discontented standards One cannot see how the human race evolved if such quality and abundance were necessary How far the psychogenic effects have come into play among mothers who have been the subjects of surveys of undernutrition it is impossible to say; they are an inescapable part of the mother's circumstances in famine Precise knowledge is therefore needed to reassure some well fed mothers as well as to guard the poorly nourished from depletion

By all accounts the mammary equipment of the African negress is efficient. This is usually attributed to genetic qualities A possible extra factor might perhaps be the subject of conjecture Liver disease is sometimes accompanied by gynæcomastia in men a fact attributed to failure of the liver to inactivate œstrogens Is it possible that liver disease in Africans causes increase of breast tissue and that by this mechanism reproductive efficiency may be aided as well as impaired by chronic malnutrition?

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ACUTE INFECTIONS OF THE FINGERS AND HAND

SIR —I have read with much interest and profit Mr Bailey's account (Jan 26) of the hand and finger infections treated at University College Hospital in 1951 It is one of the few articles on this subject in recent years based on a large and comprehensive series and not devoted to the investigation of a special line of treatment With the exception of penicillin, Mr Bailey's rules of management coincide in principle with those described in pre-antibiotic days by Kanavel Fifield, and others: that is there should be rest in the position of function and drainage of localised pus by incision inflicting no permanent damage on the hand. Mr Bailey does not list separately or emphasise as the earlier workers did maintenance and restoration of function

Is it not reasonable to suppose that antibiotics should now permit modifications in some of these classical rules of treatment—especially in view of Mr Bailey's statement with which all will agree that complications still occur and can be troublesome? It is probable that over 90% of the organisms in these infections are antibiotic-sensitive at the time of primary drainage more radical surgery than might have been safe before the introduction of antibiotics is therefore justifiable The two causes of pus in finger infections are bacterial activity and dead tissues Antibiotics may be expected to control the one the dead tissue soft or bony, is under surgical control. When all dead tissue is removed at primary operation drainage is unnecessary and primary healing can be expected It is also possible that healing may be accelerated and complications lessened if the raw surfaces are sutured together The evidence for this view comes from Oxford and Windsor where work has suggested that at any rate in certain cases, the primary suture of pulp-space and subcutaneous abscesses under antibiotic cover may give improved results An unpublished series recently investigated at Guy's Hospital by Dr P Kendall further supports this view

A comparison of some of the reported healing times for pulp space abscesses bears on this point

Anderson[1] dealing with a comparable group to Mr Bailey's, gives an average disability period of 15 8 days (from first attendance) for a series of outpatients at Guy's Hospital who were treated along classical lines and almost entirely without antibiotics. This series may be taken as a base-line from which to judge the improvement afforded by antibiotics and other means of treatment Mr. Bailey gives an average of 18 7 days of disability For smaller series of pulp-space abscesses treated by excision and primary suture Loudon et al.[2] give an average of 11 days of disability (from surgical treatment), and Arden et al [3] give 12 days—Kendall's figure for a small series treated similarly is 5 8 days with no complications. The criteria of healing adopted by Anderson and Kendall were that the finger was scab free and dressing free. Mr Bailey includes in his criteria the return of full function. Interpreted literally this must mean freedom from tenderness, return of normal suppleness in the scar, and full joint movement. These processes may take many days after re epithelialisation and would add very considerably to the average time of healing.

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[1] Anderson, K. F. *Guy's Hosp Rep* 1949 98 175

[2] Loudon J B., Minlero J D., Scott J C *J Bone Jt Surg* 1948 30B 409

Essential features in the treatment by primary suture are administration of penicillin, careful exploration and examination of the abscess cavity (under tourniquet), and meticulous (though minimal) excision of all obviously dead tissue.

I am not myself yet convinced of either the need or the wisdom of inserting sutures into inflamed pulps, where the walls of the abscess cavities for the most part lie together readily after pus evacuation, the return of tensile strength in these sutured fingers can be extra ordinarily rapid. While simple evacuation of pus may suffice for some early pulp-space abscesses, a search for and removal of all dead tissue, soft and bony, in the walls of these abscesses conforms with the known necessities for abscesses and infected wounds in other parts of the body, whenever such an excision can be done safely. The figures quoted above support the view that results are improved if the surgery comprises more than simple evacuation of pus. For the great majority of pulp space abscesses today the healing-rate after thorough surgery approximates closely to that for clean sutured wounds of the pulp. The remaining need is for an antibiotic or other agent which can be relied on to cause the resolution of an established pulp infection, and obviate the need for surgery.

I do not agree that surgery still has to await the certain localisation and unequivocal presence of pus. This delay may amount to 3 days, and is often greater. In addition to the extra pain caused, it increases the risk of sequestration and slough formation. Antibiotic cover makes earlier incision safe, and I have yet to see one of the acute diffuse infections described by Koch follow such early drainage, even when the incision has anteceded the pus. My practice is not to delay incision for more than 2 days after the onset of symptoms.

London, W 1

PATRICK CLARKSON

SIR,—I read with interest Mr Bailey's article and the letter (Feb 2) from Mr McNeill Love. The length of treatment required in cases of erysipeloid may perhaps be due to delay in administration of penicillin. It is usually the failures in treatment or the untreated who reach hospital, and by then the infection is well established.

A series of 29 cases seen at an industrial clinic afforded opportunities for early treatment and showed the need for continuing injections after cessation of symptoms. Of these 29, 19 were cured by injections of penicillin 200,000–400,000 units twice daily for 4 days or less. In 10 cases recurrence took place after a latent period of 3–5 days, and further injections were given for 2–3 days. In 4 of these cases there was a second recurrence after a further latent period of 3–8 days. In 2 of these the symptoms cleared after penicillin injections for 2 days; 2 were given fomentations for a week, but the condition deteriorated and they required penicillin injections for 7 and 10 days respectively. All but 3 of these patients remained at work. In 3 cases the patients unfortunately had an incision at hospital—in 1 case as an emergency by an experienced surgeon. Pain and discomfort were more prominent than Mr Bailey suggests.

Community Centre
Slough

M E M HERFORD

AURICULAR FLUTTER

SIR,—In your annotation of Feb 2 you refer to Prinzmetal's observation that the TA wave may be related to auricular strain.

In 1939, in collaboration with R Langendorf, I fully described the electrocardiographic pattern of left and right auricular strain as manifested in displacements of the P–R segment.[1] In left auricular strain this segment is depressed in lead I (II) and elevated in lead III, while in right auricular strain it is depressed in lead III (II) and isoelectric in lead I. The displacement exceeds 0 05 milli-volts in pathological conditions and is analogous to the well-known changes in ventricular strain. We also showed that the pattern of right auricular strain can be observed in auricular tachycardia.

It was already known[2] that the PTA wave extended well into the ventricular complex, its duration being about 0 40 sec, and that sometimes, particularly after exercise, it influenced the shape of the RST segment. The depression of the RST segment is actually caused by extension into it of the depression of the PTA wave. The duration of the PTA wave can be easily assessed in cases of 1st degree auriculoventricular block.

In acute rheumatic carditis, as I have since observed, the auricular PR segment undergoes the same changes as does the ventricular pattern, and, with ischæmia, in most cases of long-standing arterial hypertension[3] the pattern of right auricular strain can be seen.

Leicester

LEO HAHN

INDUSTRIAL DERMATITIS

SIR,—Dr Hewitt's article of Dec 15 seems to show that there may be considerable difference in different parts of the country.

The medical interviewing committee of the Ministry of Labour which meets at the Prince of Wales's Hospital, Tottenham, advises the disablement resettlement officers of Tottenham and the surrounding boroughs, who serve a population of 1–2 million. It has had referred to it, and has followed up, 192 disabled persons (178 males, 14 females) in the past three years. These were all cases on which advice was desirable as to the exact nature of the disablement and the possibility of placing, training and resettlement. Of the 192, only 3 were referred by reason of industrial skin disability. These 3 cases were as follows.

A painter and decorator, aged 61, seen on June 1, 1949, was first notified in 1947 as a case of industrial dermatitis and received £200 compensation. The committee reported that it saw no reason why he should not return to work at his usual occupation, and his own doctor was advised to this effect. He ceased signing on at the local office and drew National Insurance sickness benefit. He was checked again and he is still "sick and unfit for work."

A male 'Bakelite' moulder was seen on Feb 14, 1951, when he complained of gastric ulcer and industrial dermatitis. He had had eight jobs in six months. The committee reported that his gastric condition was not likely to bother him, and that his skin condition, although mildly ichthyotic, need not prevent him working. He was successfully placed as a labourer on March 27 and is still so employed.

A 46 year-old woman, a gown presser, was seen on Oct. 3, 1951. She complained of industrial skin disease for the past 6 years and effects of laminectomy for sciatica. The committee reported that the skin condition was unlikely to improve, but she was referred to the orthopædic department for treatment of the spinal condition and is still attending hospital and is unfit for work.

The records of 4000 cases of disabled persons who have registered at the Tottenham Labour Exchange have been examined. In all, 18 people were found to have had skin disease at the time of registration. Of these, only 1 is now unemployed. He registered on Dec 1, 1950, and although he has had various short term jobs he has been unplaced since Jan 2 this year In 2 further cases the men reached the age of 65 and retired and were thereby automatically withdrawn from the list. Of the 15 who are now employed 13 have been trained for or have been found employment in different work

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[3] Arden G P, Kitchen A P Powell H D W *Lancet* 1949 ii, 188

[1] Hahn L Langendorf R *Acta med scand* 1939 100 279
[2] Goldhammer S Scherf D *Z klin Med* 1932 122 134
Herles, F *Čas lék čes* 1936 75 600
[3] Hahn L *Brit Heart J* 1940 2 101

Thus the problem of industrial skin disease in North east London does not appear to be as onerous as in Manchester

L B BOURNE

London, N.5

Chairman, Medical Interviewing Committee Tottenham

TOXICITY OF DIHYDROSTREPTOMYCIN SULPHATE

SIR,—Permit me to correct a partially erroneous account of my own work as well as a serious misapprehension concerning the relationship between the potency of dihydrostreptomycin and its purity both contained in the article by Dr Don and Dr Gregory (Jan 12) I am quoted there as having found that both streptomycin and dihydrostreptomycin sulphate have little effect on the auditory nerve of the cat. My actual observations[1 2] were that whereas severe depression of the microphonic response of the cochlea occurred in some of the animals treated for a month with very large doses of the various salts of streptomycin such changes did not occur in those treated for even longer periods with equally large doses of crystalline dihydrostreptomycin sulphate. Vestibular function on the other hand which was abolished in the cats receiving streptomycin was disturbed in all of those receiving dihydrostreptomycin Both the streptomycin and the dihydrostreptomycin used were at least 95% pure

With a less highly purified sample of amorphous dihydrostreptomycin hydrochloride (about 73% pure) moderate depression of cochlear function was recorded Hydroxystreptomycin[3] and the various neomycins,[4] certain of which have a remarkable degree of ototoxicity had a greater effect on the cochlea than on the vestibular end-organs. I have suggested therefore that such substances or other compounds closely related to them may have been present as impurities in some preparations of dihydrostreptomycin hydrochloride and sulphate employed in the treatment of tuberculosis. Although the record is not always clear, samples of both salts are reported by various authors to have caused serious impairment of hearing in a number of their patients, often without producing the disturbance of vestibular function frequently encountered in streptomycin therapy It is my assumption that such highly ototoxic impurities, which admittedly have not yet been identified by chemical means, can enhance whatever ototoxic property may be inherent in dihydrostreptomycin itself

Unfortunately Dr Don and Dr Gregory have also mistranslated potency values for dihydrostreptomycin preparations directly into expressions of per-cent purity This by no means uncommon mistake has led them to conclude quite erroneously that the dihydrostreptomycin sulphate used or recommended by earlier investigators was much less highly purified than that employed in their own study For dihydrostreptomycin sulphate a purity of 100% is represented by a potency or antimicrobial activity equivalent to that of 800 µg of dihydrostreptomycin base (=800 units) per mg of substance—a value which may be estimated by microbiological or chemical assay This theoretical maximum potency is determined by the ratio of the molecular weight of dihydrostreptomycin base to that of the dihydrostreptomycin salt:

$$C_{21}H_{41}O_{12}N_7/C_{21}H_{41}O_{12}N_7\,1\tfrac{1}{2}H_2SO_4 = 583{\cdot}6/730{\cdot}7 = 0{\cdot}799$$

Therefore a potency of 725 µg of base per mg of substance which is the present minimum standard for crystalline dihydrostreptomycin sulphate as established by the U.S Food and Drug Administration represents a purity of 725/800 or almost 91% and not 72 5% as Dr Don and Dr Gregory have assumed Similar corrections should be applied to the other figures which they quote from the American literature The crystalline dihydrostreptomycin sulphate actually being used in this country at the present time has a purity substantially higher than 91% The figure of 88% (700–710 µg of base per mg of substance) cited as the minimum purity of the present British material is to the best of my knowledge correct

It is perhaps a counsel of perfection to urge that no dihydrostreptomycin should be used unless its potency approaches the theoretical maximum Nevertheless I continue to believe despite a number of adverse reports which have appeared concerning certain preparations of this antibiotic that the still controversial questions of its ototoxicity and efficacy as compared with streptomycin can be answered only by investigations conducted with material of the highest purity available.

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Rahway New Jersey U.S A.

JOSEPH E HAWKINS Jun.

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[1] Hawkins, J E. jun. Transactions of the 9th Streptomycin Conference Veterans Administration, Washington 1950 p 109

[2] Hawkins, J E. jun. *J Pharmacol.* 1950 100 38

[3] Hawkins J E. jun Transactions of the 10th Conference on the Chemotherapy of Tuberculosis Veterans Administration Washington; 1951 p 221

[4] Hawkins J E. jun. Transactions of the 11th Conference on the Chemotherapy of Tuberculosis Veterans Administration Washington; 1952 (in the press)

TUBERCULIN JELLY TEST

SIR —I was interested to read the letters of Dr Grzybowski (Dec. 15) and Dr Duncan Leys (Jan 5) concerning the tuberculin jelly test in children as their experience differs from mine

A few years ago I personally tested a series of 160 children in order to compare the efficacy of the jelly test with that of the Mantoux test In each case I applied a jelly test and at the same time did a Mantoux test, using the purified protein derivative (P P D) first strength In those cases where the latter was negative I repeated the test using the second strength (equivalent to 1 100 Old Tuberculin) 74 children were shown to be tuberculin positive; 65 showed a positive reaction to both the jelly and the first-strength P.P D., while another 6 showed a positive reaction to the jelly combined with a positive reaction to the second strength In only 3 cases was a positive Mantoux reaction obtained to the second strength P.P D in the absence of a positive jelly result. In this series, therefore examined before the use of flour paper in the preparation of the skin the tuberculin jelly test failed to demonstrate tuberculin sensitivity in only 4% of cases. It can be assumed that if flour paper had been used this figure would have been even smaller

It may not be generally known that, for the jelly test to be really effective certain measures are necessary:

1 The skin should be cleansed with either acetone or anæsthetic ether It appears that neither spirit nor methylated ether is adequate to remove the natural body grease I have known several cases where the jelly test has appeared to be negative when one of the latter was used as the cleansing agent, but where a positive reaction was obtained when the test was repeated using acetone.

2. Flour paper readily loses its efficacy, and one piece should not be used more than half a dozen times; if used too often a false negative result may be obtained

3 It is important that the result of the test is not read until at least twenty four hours after removal of the plaster when any reaction due to the plaster itself will usually have faded One feels that some at least of the false positives reported may have been due to too early reading of the test

4. It greatly facilitates accurate reading if the jelly is applied in a distinctive form, such as in the shape of the letter V and if it is used sparingly so that when the plaster is applied it remains in this form instead of coalescing to form a smudge.

The tuberculin jelly test is of such value for children attending clinics that it would be a great pity for it to fall into needless disrepute

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V U LUTWYCHE

BLOOD-GROUPS AND REPRODUCTION

SIR,—The regrettable errors of calculation to which Dr Sanghvi has referred (Jan 26) gave no false, strength to my general case (Jan 12), nor was my statistical offence in combining his Bombay and New York figures either so grave or so naïve as he implies Its dual purpose was to increase the size of sample and to render this larger sample considerably closer to that of Waterhouse and Hogben[1] in ABO and Rh blood-group distribution than are either of Sanghvi's[2] samples taken separately Given the Indian distribution of Rh blood-groups, the Bombay sample must contain roughly half the percentage of Rh-negatives in the Waterhouse and Hogben (Caucasian) sample, whilst the smaller New York sample consists very largely of Rh-negative individuals On the other hand, the New York sample is very close to Waterhouse and Hogben's in its incidence of B, whereas the percentage of B is more than twice as great in the Bombay sample

The importance of ABO blood group distribution in this connection can be seen from Sanghvi's own data In every one of the eleven classes (save O ex O) in his combined Bombay and New York sample in which the ratio of male to female infants at birth is greater than unity, at least one B gene is to be found in either the infant or the mother or in both, whereas in the only three classes—all major—with a ratio lower than unity neither the infant nor the mother has a B gene, but one or other of them, or both, has at least one A gene Thus would lead one to expect that any race with a higher B + O content than another would have a higher ratio of male to female infants at birth, and in Sanghvi's Bombay sample the sex ratio is 1 20 to 1 (or 6 to 5) whilst in his New York sample it is 1 11 to 1 (or 11 to 10) Indeed, in the light of the Hirszfelds'[3] long confirmed discovery that the frequency of the B gene falls more or less steadily, whilst the frequency of the A gene rises, from Eastern Asia to Western Europe and North America, one is led to the conclusion that the ratio of male to female infants at birth will be found to reveal much the same geographical gradation.

TABLE I—CORRELATION OF FERTILITY DATA OF WATERHOUSE AND HOGBEN WITH SEX-RATIO DATA OF SANGHVI

Waterhouse and Hogben's data				Sanghvi's New York data [2]			
No of families in sample	No of children in sample	Types of mating	Average no of children per family	Ratio of male to female infants	Infants ex mothers	No of male infants born	No of female infants born
59	210	B × A	3 56	1 93	B ex B	29	15
17	62	B × B	3 53	1 76	B ex A	7	4
66	229	B × O	3 47	1 08	A ex O	55	51
244	835	O × A	3 42	1 00	O ex B	21	21
209	686	A × O	3 28	1 00	A ex B	6	6
54	171	O × B	3 17	0 91	B ex O	21	23
189	599	A × A	3 17	0 84	A ex A	85	101
63	196	A × B	3 11	0 83	O ex A	45	54

That my working interpretation of the Waterhouse Hogben data, like Dr Sanghvi's interpretation of his own sex-ratio data, is more genetic than serological seemed to be clear from my previous letter, but the position is shown concretely on the left-hand side of table I

In this the least obvious of the many points of interest is that the combined average number of children per family is 3 33 for the matings B × A and A × B, 3 33 for B × O and O × B, and 3 36 for O × A and A × O (For the matings O × O and A × A it is 3 33, whilst for B × B and AB × it is 3 31, and for the remaining six rare matings 3 35) T over all descending order of fertility in the sample is B O in the case of fathers, whether the mother is A, O, or B— that is, both in homospecific and heterospecific matings— whilst in mothers the descending order is (more or less) A O B, complete reciprocity with male fertility being prevented by the descending order of the crucial matings B × B O × O, and A × A This would suggest paternal dominance, given the genetic interpetation of the findings, but that serological factors may also be active, whether before or after conception[4] or before or after birth,[5] is suggested by table II An ABO mating is said to be heterospecific when the husband possesses an A or B antigen lacking in his wife

TABLE II—COMPARATIVE FERTILITY OF PARENTS, WITH REGA TO ABO SPECIFICITY, ACCORDING TO DATA OF WATERHOU AND HOGBEN

Average number of children per family					
Group of parent		Specificity of parent		Group of parent	
A	B			AB	O
3·07	3 04	Heterospecific mother	Heterospecific father	3 38	
3 31	3 28	Homospecific mother	Homospecific mother	3 22	3·47
3 24	3 51	Heterospecific father	Homospecific father	2·66	3 39
3 20	3 68	Homospecific father	Heterospecific mother		3 31

The genetic reciprocity seen on the left-hand side of table I is fairly well mirrored on the right-hand side, which gives Sanghvi's New York data in isolation The New York figures, however, suggest less clearly than do the combined figures, given in my previous letter, that a loss of group B females, either before or during gestation, is accompanied by a loss of group A males—a differential selection paralleled by the Waterhouse Hogben sample, in which, on the average, the least fertile females are those of group B and the least fertile males are those of group A, and in my sample of infertile matings, with its excess of group B wives and of group A husbands Unfortunately, too, there is no indication in Sanghvi's paper of the birth rank—which is likely to be important—of the infants in either sample, nor has he stated whether all the individuals in his New York sample were white Moreover, one cannot overlook the possible influence of the Rh groups in the determination of sex ratio

In this connection the Rh findings in abortion, summarised in my previous letter, make specific the general findings of Hirszfeld[6] in Wroclaw Indeed, the substantial correlation, in abortion, between the Rh mating of Rh negative husband × Rh positive wife and the ABO matings of lower than average fertility according to the Waterhouse Hogben data seems to be more or less progressive from A × O through O × B and A × A to A × B, whilst the reciprocal correla

TABLE III—THE GENOTYPIC RH MATINGS

Hetero specific matings	Homospecific matings			Hetero-specific matings
Wife homo zygous	Both partners homo zygous	Wife hetero zygous	Both partners homo zygous	Wife homo-zygous
Rh rh × Rh Rh rh rh × Rh Rh	Rh Rh × Rh Rh	Rh Rh × Rh rh Rh rh × Rh rh rh rh × Rh rh	rh rh × rh rh	Rh rh × rh rh Rh Rh × rh rh

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1 Waterhouse J A H Hogben L *Brit J soc Med* 1947, 1, 1
2 Sanghvi, L D *Nature Lond* 1951 168 1077
3 Hirszfeld L Hirszfeld H *Lancet* 1919 ii 675

4 Race R R Sanger R Blood Groups in Man Oxford 1950
5 Struthers, D *Brit J soc Med* 1951 5 4
6 Hirszfeld L *Polsk Tyg lek* 1947, 2 28 *Rev Hém* 1949 4 3 *Med Hyg* 1950 8, 299 , *Schweiz Z allg Path* 1951, 2, 133

ion—that between Rh positive husband × Rh negative wife and the matings of higher than average fertility—is more or less progressive from O × A through O × O and B × O to B × A. The Rh matings apart however the tendency to abortion seems to progress from B × O to A × B

In view of the probable involvement of the Rh mating of Rh negative husband × Rh positive wife it should be made clear that, as can be seen from table III the only circumstances under which Rh heterospecificity can exist between mother and fœtus are the presence of a heterozygous Rh positive fœtus in a homozygous Rh negative mother and of a heterozygous Rh positive fœtus in a homozygous Rh positive mother It follows that if in fact, abortion is encouraged by both the forms of Rh incompatibility it must occur less often (though relatively more often) in the mating of Rh negative husband × Rh positive wife than in the mating of Rh positive husband × Rh positive wife This being so any over-all shortage, in abortion of the mating of Rh positive husband × Rh positive wife should be rather less marked in association with the sub fertile ABO matings; and this is exactly the situation in the abortion sample grouped in this laboratory

Aberdeen and North East of Scotland
Blood Transfusion Service

T M ALLAN

HYPOKALÆMIA IN ACUTE LEUKÆMIA

SIR,—Dr Videbæk[1] suggests that hypokalæmia, found in two patients with acute leukæmia may contribute to morbidity in this disease Many hæmatologists have arrived at the parallel conclusion that often in acute leukæmia the morbidity cannot easily be explained simply by the morphological leukæmic infiltration of tissues.

Pronounced potassium depletion as a component of the electrolyte imbalance in all the adaptative diseases, including leukæmia has been repeatedly reported by me, not only in patients having definitive adrenocortico therapy, but in those receiving antibiotics.[2] This depletion is not necessarily reflected in demonstrably low serum potassium levels and the possibility of it should not be dismissed on the ground that the level is normal. One young female patient with acute leukæmia and a serum potassium of 3 8 m.eq per litre was nevertheless found to be excreting in the urine 225–375 m eq daily over a two week period She was ultimately only brought into potassium balance by daily administration of 20 g of the chloride. I now administer as a routine 4–8 g of the enteric-coated tablets to all patients with serious 'mesenchymal or collagen vascular disease[3]

That patients with a diminished erythrocyte-cholinesterase must inevitably lose potassium from all body cells was pointed out to me by Dr Margaret Greig over two years ago as a consequence of her hypothesis that cholinesterases regulate general cellular permeability[4] Dr Greig and her students have subsequently shown[5] that reduction of erythrocyte-cholinesterase content results in pronounced diffusion of potassium from erythrocytes. It is in acute leukæmia and in addisonian anæmia that the lowest erythrocyte-cholinesterase levels have been recorded[6] We can also record with some whimsy that half a century ago Rumpf[7] reporting the results of chemical tissue analyses from pernicious anæmia subjects, emphasised the general poverty of the body in potassium in that disease and suggested possible therapeutic applications of his finding

However belated exploration of the virgin fields of humoral and/or electrolyte imbalance in acute leukæmia may still rescue the science of hæmatology from the advanced insolvency which is still apparent only to certain of its practitioners this insolvency brought about by over confidence in the soundness of obsolete morphological premises, is reflected in the "anti fol" and nitrogen mustard debacles

Laurelton, Long Island
New York, U.S.A.

ROBERT D BARNARD

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[1] Videbæk, A *Lancet* 1951 ii 912.
[2] N Y *St. J Med.* 1951 51 334
[3] *Hawaii med. J* (in the press)
[4] Greig, M E., Holland W C *Science* 1949 110 23
[5] *Arch Biochem* 1951 30, 411
[6] Barnard, R D Strauss, H , Fitch H M., Lehman R. A Walker R. A *Science* 1946 104 419
[7] *Berl klin Wschr* 1901 38 477

COLLEGES AND FACULTIES

SIR,—Others will have appreciated, as I did, the good sense of Dr G O Barber's letter in your issue of Feb 9 His point that there is a unity in medicine ' and that the patient should be treated by a team which works closely together ' deserves closer examination Only too often at present the difficult case referred to hospital is passed from specialist to specialist with nobody in charge to direct operations or to take a comprehensive view of the patient.

The therapeutic team clearly requires a captain Who is it to be? Dr Barber will probably agree that the proper person ought to be the family doctor But in order to direct and coördinate the activities of the team the captain must not only know a great deal about the patient, he must also know a great deal of medicine Moreover he must be fully conversant with the scope and limitations of the various specialties and further with the capabilities and limitations of the specialists available to his patient Divorced as he so often is at present from hospital medicine, how can the family doctor qualify for the position of captain? But if he cannot, who else can? Since the virtual disappearance of the general physician there is nobody

Crediton Devon.

L N JACKSON

AN UNUSUAL EPIDEMIC

SIR —Cases such as you describe in your annotation last week which may justifiably be diagnosed as acute labyrinthitis must be familiar to most neurologists I find that during the past seven years I have met with some 50 cases at hospital and in consulting practice The onset of vertigo is almost invariably sudden; and as with Ménière's syndrome the first attack is usually the most severe Vomiting at the onset is common, and nystagmus is often but not invariably present. Nystagmus, however in my experience continues for only a short time usually not longer than a few days although it may recur during subsequent attacks of vertigo which nearly always become progessively milder Slight tinnitus may be present at first (8 out of 50 cases) but does not persist and any impairment of hearing is unusual Of the 50 cases 9 showed very mild perceptive deafness which gradually improved In most cases no incoördination could be demonstrated (only 2 of the 50 cases)

Usually the disorder gradually improves, although symptoms may continue with slowly decreasing intensity for anything from six weeks to nine or more rarely twelve months. Nevertheless in cases where recovery takes place quickly even when the spontaneous attacks of vertigo have ceased the labyrinth may remain somewhat sensitive to sudden changes of posture for some time longer

The ages of the 50 patients ranged from 23 to 64 I have met with only one case in a younger patient who was 18 years of age

Apart from the symptoms described the diagnosis can only be made by excluding other possible causes of vertigo Ménière's syndrome is excluded by the absence of any noteworthy or persistent deafness and tinnitus as well as by the subsequent course In those cases that it has been possible to follow up recovery has occurred without subsequent symptoms, except in 2 cases where the patients had a recurrence a few years later

In 1 case, at first thought to be of acute labyrinthitis n account of the absence of physical signs and the fact hat the vertiginous attacks disappeared within six weeks f the onset, the diagnosis subsequently proved to be disseminated sclerosis. In this case signs of an upper-neurone paraparesis appeared two years later

I have not met with more than one case in a family

Regarding treatment, a small dose of potassium or sodium bromide (gr. 5–7½ t d.s) appears to be quite as efficacious as phenobarbitone (gr ½), and drowsiness is avoided

London, W 1

C WORSTER-DROUGHT.

SIR,—You ask whether other practitioners have been seeing cases of acute labyrinthitis. My interest in this condition was aroused by Professor Meulengracht's[1] suggestion that the illness described in Scandinavian countries as "neuralabyrinthitis epidemica" or "vertigo epidemica" might be occurring in England. In June, 1951, I was able to describe 3 cases occurring in my practice,[2] and Dr Marguerite Stewart[3] has also described the condition A short search of English published work only revealed 4 cases, described by Dr P. A Walford[4] under the title of "Influenzal vertigo"

I have now seen 12 cases, 6 of which have been severe as described in your annotation The others have been milder with transient nystagmus and with less pronounced vertigo These mild cases have been mostly in children under twelve. It is the middle aged patient who is most severely hit, and who takes longest to recover A number of mild relapses have been seen between the 14th and 21st days I have been most impressed by the dramatic response of the vomiting in these cases to 'Avomine' (promethazine-8-chlorotheophyllinate) On the 2nd day the patient may be eating a full meal, yet be unable to sit up in bed without precipitating severe vertigo My cases have been scattered over a semirural area, and while I have not seen 2 definite cases in one household, I have seen the infection apparently transmitted from one child to his playmate, with an interval of about 28 days

I have little doubt that this is a generalised virus infection, but I believe proof that it is exclusively a labyrinthitis is lacking I have therefore used the non-committal name of epidemic vertigo

Stroud Gloucestershire

S CLIFFORD ROGERS

SIR,—I suggest that the sudden but transient vertigo in the cases you mention was due, not to labyrinthitis, but to changes in labyrinthine pressure from eustachian obstruction—in many cases probably by a small plug of viscid mucus. Such events are quite common, especially in those recovering from mild coryza, and on this account tend to appear in crops. The description you give is fairly typical of this condition with two exceptions (I assume that the "nystagmus of labyrinthine type" was mixed horizontal and rotary, not purely rotary) One unusual feature is the absence of deafness, this absence is not very rare, but among 6 patients one would have expected to find it occasionally Secondly there was no nausea For several patients with vertigo, labyrinthine type nystagmus, and vomiting not to have nausea is really quite extraordinary. It is a pity that we have no account of the appearances or hearing during the acute phase, nor of the effect of inflating the ears, which often affords rapid relief

These cases are common and alarming, but the fact that the otologist found no evidence of ear disease after recovery should be enough to rule out labyrinthitis, and makes the diagnosis almost certain

Bristol

E WATSON WILLIAMS

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[1] Meulengracht, E. *Brit med. J* 1950, ii, 1493
[2] Rogers S. C *Ibid*, 1951, i 1391
[3] Stewart, M. *Ibid*, ii, 1032
[4] Walford, P A. *Ibid* 1949 i, 821

ADRENAL FUNCTION AND EPILEPSY

SIR,—Last year I reported[1] that diphenylhydantoi sodium ('Dilantin Sodium'), 15 mg per kg body weight per day by intraperitoneal injection, produced degeneration of the adrenal cortex in mice. This effe has since been obtained, over the same period of time, with 9 mg per kg body-weight per day—a dose likely to be equivalent pharmacologically to the maximum clinical dose by mouth in man (approximately 6 mg per kg body-weight per day)

An observation on an epileptic (a girl, aged 17 years) treated with diphenylhydantoin sodium, 6 3 mg per kg body-weight per day, throws further light on the possible action of this compound.

The patient, whose attacks were being controlled, was given calcium aspirin 1 85 g (approximately 30 mg per kg body-weight) per day for three days while the treatment with diphenylhydantoin sodium was continued. During this period the epilepsy was no longer controlled, but when the aspirin was withdrawn the diphenylhydantoin sodium was again effective

Since salicylates apparently stimulate adrenocorti function,[2] and since A C T.H and compound E increase the severity of 'Agene' epilepsy in dogs,[3] it appears likely that in man the anticonvulsant effect of dipheny hydantoin sodium is due to decreased adrenocorti activity Further, I suggest that idiopathic epilepsy may result from deranged adrenocortical function—a vi supported by the following reported observations

1 The adrenals of epileptic patients were heavier contained more cholesterol than those of controls.[4]

2 In rats adrenalectomy diminished the response to convulsive stimuli[5]

3 In rats deoxycortone acetate reduced the excitability of the central nervous system, the excitability could restored by simultaneous administration of A.C T.H. or whole extract of the adrenal cortex.[6]

4 In man deoxycortone acetate has been used with succe to treat epilepsy previously controlled by barbiturates.[7]

Whereas the above explanation is the simplest, two alternatives should also be considered (*a*) that th central nervous system in idiopathic epilepsy is hyper sensitive to stressful stimuli in which event adre hypertrophy would be expected; or (*b*) that the cen nervous system is hypersensitive to adrenocorti hormones

Department of Zoology, King's College,
University of London

P H STAPLE

PSYCHOLOGY AND THE MATERNITY UNIT

SIR,—I have read with great interest the article by Dr Elizabeth Tylden (Feb 2) Childbirth should be primarily the concern of the obstetrician To understand this function it is not necessary to be surgically minded or experienced in the surgical technique required of the gynæcologist The birth of a child is not a purely pelvic performance although the major part of the apparatus of reproduction is housed in that portion of the body. Every physiological function of woman is directly cerned with pregnancy, parturition, and motherhoo

There is a considerable difference between the obstetr and the midwife, whether man or woman, the latter skilled performer of delivery and those things immedia concerned with the arrival of the child. The obstetrician *physician* who understands, so far as modern science allo him, the chemistry, metabolism, and neurology of the bo as well as the influence of the mental processes upon norm hysiological activities It follows, therefore that he is miliar with variations within the normal mean of these portant contributory factors to successful childbirth He s an expert knowledge of changes which must be considered normal or pathological; these include conditions of the lood, the renal function the internal secretory glands as ell as the heart, the lungs, and the digestive system. But nce it has been shown that many of these changes are anifestations of the mental processes of a woman, the ychology of reproduction must essentially be one of the ost important aspects in the training of obstetricians. This more clearly understood if a careful survey is made of the ar-tension pain syndrome and its implications.

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[1] Staple, P H *Lancet*, 1951, i, 1074
[2] Cochran, J B , Watson, R D , Reid, J *Brit med. J* 1950, i 1411 Robinson, F B *Ibid*, 1951, i, 300. Van Cauwenberge, H *Lancet*, 1951, ii 686
[3] Costa, P J Bonnycastle, D D *Fed. Proc.* 1951, 10, 289 Costa P J Personal communication, 1951.
[4] Wendt, G G *Arch. Psychiat* 1940 183, 418
[5] Griffiths, W J *J comp physiol. Psychol.* 1949, 42, 303
[6] Woodbury, W J, Chi Ping Cheng, Sayers, G , Goodman, L. S *Amer J Physiol.* 1950, 160, 217
[7] McQuarrie I *J clin Endocrinol.* 1942, 2, 406, *Amer J Di Child* 1946, 72 472.

Owing to the trend of modern gynæcological training, here are very few obstetricians in our profession, which at resent is satisfied to allow most young mothers of our time be cared for by midwives and gynæcologists.

When Dr Tylden writes: "The intrusion of Grantly Dick Read as an obstetrician into the field of psychology has contributed considerably to our understanding" he tells us that her concept of an obstetrician is fallacious. I am neither a psychologist, a neurologist, a dietitian, a hæmatologist, nor a biochemist but inasmuch as these subjects concern the preparation of women or childbirth and the understanding of the phenomena of parturition, it is necessary to be familiar with certain spects of each of these branches of our science. The ure psychiatrist occupied with the investigations that Dr Tylden is carrying out, is in the same position as the iochemist who endeavours, from his point of view to ell us exactly what goes on within the woman during regnancy Similarly the hæmatologist who presents s with the normal range of blood changes during the ntenatal months and during labour, adds his quota to he obstetrician's knowledge

I hesitate to accept the suggestion of Dr Tylden that ecause I am familiar with these subjects, I am intruding pon biochemistry hæmatology and psychology do intrude upon dentistry because I diagnose hypertrophic ingivitis in pregnancy or upon dermatology because diagnose and treat pruritus vulvæ? It may be that I m an intruder only into obstetrics! Our correct ttitude is to appreciate the collaboration of highly pecialised scientists who help us to a fuller understanding f the phenomena of pregnancy and labour

Over 90% of childbearing women are normal, healthy nd happy (if they are allowed to be) A knowledge of he physiology of labour, humanism and understanding re all that is required for safe and successful parturition Only 5% need expert gynæcological treatment, to overcome difficulties that they present during labour The ubjects needed for the care of 19 out of 20 women are ery scantily taught to students, if at all, and have to be picked up in later life at-the-expense of women patients. This is a short-sighted educational policy, and until it is corrected obstetric science will not advance as it should

Dr Tylden's paragraphs upon the organisation of the abour ward and the disorganisation of the mind of the patient are excellent, and unhappily true Successful physiological labour can only be obtained if the labour s correctly conducted

> This includes, among other requisites: sound and experienced midwifery; an understanding of the varying physical and emotional phenomena of labour from the warnings of its nset to the completion of the third stage; concentrated are of the woman's mind to protect it from past associations of hearsay and experience and to prevent her from being motionally disturbed by the words or actions of those present; nd firm but kindly control of the patient and the situation from eginning to end. This last gives women a sense of understanding and confidence which eliminates anxiety for the ltimate outcome of their efforts.

In my last twenty years it has not been necessary to have one woman subjected to specialist psychological treatment for childbirth The records show 91·8% physiological, conscious labours with only 2 serious postnatal psychopathies—both patients had previously been in mental homes. We naturally ask 'Can the psychologists improve on this?'

May I suggest that the psychologists, whilst continuing their profitable studies of the mental processes of the pregnant woman, turn more seriously to the analysis of the mental and resultant physical activities of those who attend women in childbirth? It is the mentality of the medical and midwifery profession which is withholding from 90% of women of our time fearless childbirth with the minimum of discomfort and the maximum of satisfaction in personal achievement.

Johannesburg GRANTLY DICK READ

POISONING FROM PLANTS

SIR,—May I expand Dr Thomas's note last week on poisoning by water dropwort (*Œnanthe crocata*)? The native members of the order umbelliferæ include two other poisonous plants. Water hemlock (*Cicuta virosa*) contains a picrotoxin like poison similar to that in water dropwort but hemlock (*Conium maculatum*) owes its deadly repute to coniine the action of which is rather different. A playmate of mine (*æt* about 10) used the stem as a peashooter and nonplussed his medical father by falling asleep during tea It was the agent reputed to have rid Athens of Socrates, and the account of his last hours does not suggest delirious excitement Several horses which died in these parts last spring under reasonable suspicion of eating hemlock exhibited stupefaction and incoördination. The taste, by the way is better than the smell.

If your original correspondent (Jan 19 p 155) will extend his peripatesis beyond Chiswick Eyot he will find ample subject for an M.D thesis in the comparative toxicology of the umbelliferæ he may even proceed to a doctorate in omphaloscopy

Taunton. J A. BOYCOTT

GASTRIC DILATATION IN POLIOMYELITIS

SIR,—Dr Hussain in his article last week on acute dilatation of the stomach as a late complication of poliomyelitis draws attention to the difficulty of maintaining adequate alveolar ventilation in severely paralysed cases of poliomyelitis nursed in mechanical respirators, and the need for direct measurement of pulmonary ventilation so as to avoid the dangers of hypoventilation with consequent anoxia and carbon dioxide retention

The most exact management of this type of case would involve analysis of arterial blood for O_2 saturation and plasma CO_2 pH and pCO_2, and requires access to a Van Slyke blood gas apparatus and a glass electrode pH meter—equipment not found in many infectious disease, or general, hospitals. Direct measurement of the ventilation of respirator cases with an ordinary Benedict recording spirometer or Douglas bag and flow meter is a simple method requiring little apparatus and, except in subjects with pre-existing chest disease this could be expected to provide a rapid method of ensuring that respirator ventilation does not become grossly inadequate.

Both oxygen lack and carbon dioxide excess cause similar symptoms of anxiety restlessness, hypomanic confusional states, sweating headache, stupor and coma accompanied by a pronounced increase in cerebral blood flow and cerebrospinal fluid pressure and occasionally papillœdema[1] but they differ in that carbon dioxide causes hypertension without change in cardiac output while anoxia increases cardiac output with no significant change in blood pressure.[2] Twitching of the small muscles of the face and hands and clonic movements of the limbs and trunk are more often due to carbon dioxide excess than to anoxia It is clear from the clinical history of case 1 in Dr Hussain's article, where cyanosis, tachycardia, facial spasms, hypertension *of 180/120 mm Hg, and coma developed while the* patient was in a Both respirator, that this patient was suffering from the combined effects of both oxygen lack and carbon dioxide excess, and that recovery ensued when the former was corrected by oxygen administration and the latter by increasing pulmonary ventilation Although oxygen therapy will relieve cyanosis and restore a normal arterial oxygen saturation, it cannot be expected to relieve symptoms due to carbon dioxide excess secondary to inadequate ventilation

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[1] Simpson T *Brit. med J*, 1948 ii 639
[2] Kety S S, Schmidt, C F *J clin. Invest* 1948 27 484

Dr Hussain is incorrect in stating that carbon dioxide retention leads to a fall in the alkali reserve, and that this may be used as an index of adequate ventilation In fact, the converse is true When alveolar ventilation falls below normal the same quantity of metabolic carbon dioxide must be eliminated in a smaller volume of expired air—the alveolar pCO_2 rises with consequent rise in arterial plasma CO_2 and a similar, but quantitatively *smaller, increase in the alkali reserve* A reverse sequence of events occurs with prolonged hyperventilation in a respirator[3] In any case, the alkali reserve is not a very informative estimation since it does not accurately mirror changes in the total plasma CO_2 content in respiratory *acidosis and alkalosis* *An increase in arterial* plasma CO_2 content above 66–70 volumes per 100 ml (30–31 5 m eq per litre) indicates alveolar hypoventilation and provides a useful check on the efficiency of respirator ventilation in providing for elimination of carbon dioxide

There is considerable evidence to suggest that prolonged exposure to lowered pO_2 and raised pCO_2 has a direct depressant effect on the respiratory centre Hence, it is reasonable to assume that incorrect management of cases of poliomyelitis with severe medullary involvement in the acute stage, may tip the scales against the eventual recovery of sufficient respiratory neurones for adequate ventilation out of a respirator

Institute of Diseases of the Chest
Brompton Hospital London S W 3

E K WESTLAKE

HYSTEROSALPINGOGRAPHY IN FEMALE INFERTILITY

SIR,—In his letter of Jan 26, Dr Pygott advocates screening in hysterosalpingography, in order to minimise the amount of peritoneal spill and thereby to reduce to a minimum pain from peritoneal irritation He uses 'Viskiosol Six,' which is a 50% solution of diodone rendered viscous by the addition of 6% polyvinyl alcohol At the Royal Free Hospital we employ routinely 10 ml of a simple 35% solution of diodone, such as is used for intravenous pyelography This solution, in our experience, produces very little peritoneal irritation, and gives excellent skiagrams

In any case screening introduces radiation hazards, which enormously outweigh any possible advantage gained by using a few millilitres less of contrast medium With the non screening technique described by us[4] the dose of X rays to the ovaries ranges from 1 6 to 2 röntgens in an average examination If a screening technique is employed, not only is a high dosage delivered to the ovaries during the actual screening, but in addition each film taken involves a considerably greater dosage than does a film taken by the non screening technique The explanation for this lies in the use of an under-couch X ray tube for screening, this tube is considerably nearer to the patient than the over-couch tube used in the non-screening technique, and the inverse square law for intensity of radiation makes a striking difference When this increased dosage for actual films is added to the screening dosage, a figure of round about 30 r is easily attained, even in expert hands On genetic g the exposure of the gonads of patients in the ductive phase of life to this heavy dosage is unju

Royal Free Hospital,
London, W C 1

ELLA PREISKEL
MARY POLLOCK

Obituary

MAX HARTMANN

NEWS has been received from Switzerland of the d on Feb 2 of Dr Max Hartmann, who long direc pharmaceutical research in Ciba Ltd, Basle Hartmann was born at St Gallen in 1884, and he stud chemistry and obtained his doctorate at Munich, w he early developed his love and knowledge of art. shrewd, kindly common sense, his administrative and his tolerance and understanding made him a member of many Swiss institutions besides Ciba. Swiss Chemical Society made him an honorary in recognition of his work as treasurer He was a me *of the board and a moving spirit in the establish* of the Swiss Academy, and he devoted much time to foundations for scholarships in biology and medi and in chemistry The University of Basle conferred him the honorary degree of doctor of medicine, and Swiss Polytechnical School an honorary doctorat technical science The establishment, as a charit trust, of the Ciba Foundation in London, for the pro tion of international coöperation in medical and chem research, was due to the vision of Dr Hartmann his colleagues, and his last visit to this country, in 1 was to take part, with Sir Henry Dale, in its ope ceremony

Max Hartmann's modesty and kindliness made a most sympathetic and encouraging director of rese and he made sure that the fullest credit was given it was deserved Of his many outstanding contribu to pharmaceutical research, 'Coramine' is perhaps best known, and his leadership always brought to fullest health and fruition the researches of those worked with him

G E W. W.

Appointments

CLARK, ALEXANDER, M B Glasg, D P M asst psychiatrist, Stor Hall Hospital, Kirkburton, and associated clinics
HOUSTON, FREDERICK, M R C.S, D P M asst psychiatrist, De Pole Hospital near Willerby, and associated clinics
PIERCE, J W, M D Lond M R C P, D M R.D consultant rad logist (diagnostic), Brompton Hospital London
REA, G H, M B St And, D A asst anæsthetist Royal Infirmar Edinburgh, with duties within the Scottish South Eas region.

South-East Metropolitan Regional Hospital Board:

BULLOUGH JOHN, M B Lond, D A consultant anæsthet Dartford group of hospitals
FITZGERALD M A, M.B N U I, D M.R consultant radiolog Hastings group of hospitals
FORSAITH, J R, M R.C.S D.A consultant anæsthetist, Cant bury and Isle of Thanet groups of hospitals
LEIBERMAN, D M., M D Leeds M R C.P, D.P M consulta psychiatrist, Bexley group of hospitals
MCGRATH G D, M.B N U I, D A consultant anæsthetist Sou East Kent group of hospitals
MORRISON, N D W, M R C.S, D M R D consultant radiolog Lewisham group of hospitals
WATSON, W R M R C S, D A consultant anæsthetist, Bright and Lewes and Eastbourne groups of hospitals

Appointed Factory Doctors:

AUCUTT, W H, M B Birm Dartmouth district, Devonshire.
CUTLER M J, M B Lond Hastings district, Sussex.
JONES, D J, M R.C S Narberth district, Pembrokeshire
PRICE J E, L.R C P E Llandovery district, Carmarthenshire

The Terms and Conditions of Service of Hospital Medical Dental Staff apply to all N H S hospital posts we advertise otherwise stated Canvassing disqualifies, but candidates may norm visit the hospital by appointment

The 1952 edition of *Appointments in His Majesty's Colon Service* is obtainable from H.M Stationery Office, pr *3s 0d*

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[3] Brown E B et al *J appl Physiol* 1918, 1, 333
[4] *J Obstet Gynæc* 1951, 58, 421

Notes and News

HOSPITAL PRAYERS

nts in hospital are much exposed to anxiety and tunately have a good deal of time to contemplate it is reason to think that many of them find morning rs friendly and reassuring especially if the prayers n take account of their immediate needs and fears General Hospital Nottingham with this in mind has shed *A Collection of Prayers for Use in Hospitals* and erously issuing 4000 copies free of cost to all who care ply for them provided they are willing to pay for ge and packing[1]

the foreword the compilers of the book suggest that a morning service can be broadcast from the hospital d, and that all in the wards can listen through the staff not interrupt their work. They feel that the hospitals nded for the healing of body mind, and spirit; and there is an opportunity in these services to approach who can be reached in no other way They suggest rs for 31 days, and though several prayers recur, there hness and variety The book is largely modelled, they on *New Every Morning* published by the British casting Corporation.

le many of the prayers are good short, clear and priate some are perhaps too long and abstract to l to those who come newly to the idea of any prayers l. The *Book of Common Prayer* which owes so much nmer's mastery of English hardly gets a showing; the prayers for special occasions are derived from miliar sources when they might have been the collects he days. But the compilers may well have decided to the book as undenominational as possible, and they therefore have chosen unfamiliar prayers deliberately. y case they have provided many blank pages for those wish to add prayers of their own choosing

e book is well printed and agreeably and serviceably l. The compilers and the Nottingham General Hospital ve thanks for their generosity and public spirit as well pect for their purpose

TRAPS AND RABBITS

e Home Office committee on cruelty to wild animals l the gin trap a diabolical instrument which causes ulable suffering and recommended that it should be ed by law within a short time Yet Lord Elton's Bill he prohibition of these traps was defeated on Nov 28 ar

the annual meeting of the Universities Federation of al Welfare Societies (UFAW) Major C W Hume ibed this as the loss of a battle but not of the war its, in the numbers which share the island with us now ndoubtedly a pest but their profusion is being arti y maintained he explained, by the rabbit-trapping ry If this industry could be killed and its stock of ts got rid of the increased production of bread beef, mutton, and the saving of forest trees would far out the loss of these edible rodents infested with tape-n." People engaged in this industry make great use gin trap which cannot possibly kill a rabbit outright h about half die of shock during the ensuing night) trapped rabbits examined by Miss W Phillips all ne leg broken; 73 had two legs broken. The rabbit ing industry is thus inevitably cruel; but it is also tive on, and a menace to the country's food-supply y of commercial trapping campaigns show that the rs catch only roughly a third of the rabbit population g the rest to breed and prey on crops Moreover, the ls which prey on rabbits are also exposed to the traps. ne traps will not solve these additional problems; indeed Major Hume says, well meant propaganda humane traps has proved a regrettable red herring AW advocates a policy of rabbit clearance by appropriate ne or relatively humane methods. This would kill abbit-trapping industry but would benefit the domestic t breeders, whose stock is both more wholesome and more able A centrally organised campaign could reduce t populations in areas large enough to prevent rapid dation; and farmers could be legally required to keep down the residual rabbits when the initial clearance had been done

Clearance must be paid for and unfortunately pest-control services are required to pay for themselves, in spite of the Agriculture Act 1947 Thus on the whole rabbit clearance is at present half hearted and unsuccessful besides being hindered by the effective passive resistance of the rabbit-trapping industry Major Hume is confident that expenditure on rabbit clearance would be justified by the increase in food production.

HERITAGES

OUR tradition in medicine is a heritage which we all value Mr H J Seddon, F.R.C.S., in a pamphlet on The Christian Heritage in Medicine[1] reminds us how closely this tradition is a part of the whole inheritance of Christendom There were hospitals in the pre Christian era, certainly but after the reign of Constantine when Christianity was officially recognised by the State, the Church all over the world took over the care of the sick; the like duty was accepted by the Order of the Knights of St John of Jerusalem, and it is still the inspiration of many religious orders and of the missionary hospitals to which he pays great tribute The breach between medicine and the Church in the last century came about he says, because both the scientists and the Church thought they knew the answers to everything Both sides were too confident; but in this century we are much more humble because we no longer believe—and we have very good reason for not believing—in the inevitability of progress'

This led him, like many others to examine our Christian heritage afresh, and to try to clear his mind of misconceptions about it. He draws special attention to three of these First, he says, the whole of Christianity has been overlaid by a thick fog of superstition Then, Christian theology has become a highly complicated affair; "I know nothing more depressing than to walk into the library of a theological don Thirdly we should banish from our minds the sordid history of the political church"; "there will always be so long as man is on this earth the Judases and the Vicars of Bray We would not wish our heritage and tradition in medicine to be judged by the behaviour of the meanest or even the average practitioner: 'We prefer to consider it in terms of the best people The Christian tradition embraces he says, a Person a Way of Life a Book In the last century everyone was familiar with the Bible and even if he had only listened with half-shut ears, it gave him, as Sir Richard Livingstone has put it some more permanent guide to living than the film and the cheap press uttering loudly and with the confusion of many inharmonious voices such doctrines as the prospect of immediate profit inspires. That kind of guidance Professor Seddon suggests, cannot help us to combat the dangers confronting us, nor is the struggle one into which we can enter entirely in our own strength.

Medicine offers so many kinds of life that its integration with the Christian heritage differs for different doctors The scientist who must undertake controlled experiments is in danger of thinking of his patients much as he does of his test-tubes and reagents; yet Mr Seddon believes that it is possible to be a good medical scientist and yet a completely human person. Some medical practitioners are inclined in the same way to regard the human body simply as a machine It would hardly be appropriate to talk to a patient about his soul when he comes complaining of a painful bunion but the attitude of not caring at all about the spiritual side of medical practice is completely wrong" Even in public health and especially perhaps in public health among primitive peoples, the success or failure of a campaign may depend on personal—essentially spiritual—qualities.

His recipe for developing this side of life is so old fashioned as to be almost new He recommends the Bible as a text-book, prayer and regular attendance at some place of worship with other Christian people

Association of Whole time Salaried Specialists

The first annual dinner of this association was held at the Royal College of Surgeons on Jan. 25 The guests included Sir Max Page representing the Royal College of Surgeons; Mr R E Jowett president of the Regional Hospitals Consultants and Specialists Association; and Mr J M. Milloy of the Medical Superintendents Society

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[1] e cost of these ranges from 1s for 1 copy of the book to 4d, for 1… Those who wish to make some further con ribution are free to subscribe to the patients and staff comforts nd

[1] London: The Inter-Varsity Fellowship 39 Bedford Square W C 1 Pp 16 6d

Eugenics Society

The meeting of this society which was to be held today, Friday, Feb 15, has been postponed till April 4

First International Congress of Dietetics

This congress is to be held from July 7 to 11 at the Royal Tropical Institute, Amsterdam Inquiries should be addressed to Miss Diane J Ten Haaf, general secretary of the executive committee, 13, Pomonaplein, The Hague, Netherlands.

W H O Team in South-East Asia

Prof E W H. Cruickshank, Dr H. O Schild, and Dr E Rohan Williams are touring South East Asia as members of a W.H.O team who are lecturing and doing practical work in hospitals and university departments The tour will end in Ceylon on April 6

Royal Statistical Society

A Frances Wood Prize (£30) is offered for the best "investigation, on statistical lines, of any problem bearing directly or indirectly upon the economic or social conditions of the people" Competitors must be under 30 on Jan. 1, 1952, but need not be fellows of the society Entries must be sent to the hon. secretaries of the society, 4, Portugal Street, London, W C 2, not later than Dec 31

Frustration and Fulfilment

An Easter School on this subject will be held at the Davidson Clinic, Edinburgh, from March 26 to April 1 Speakers will include Dr Winifred Rushforth, Dr W P Kraemer, and other members of the staff of the clinic, with Dr Margaret Lowenfeld, director of the Institute of Child Psychology, London, as guest lecturer. Further information may be had from the secretary, 58, Dalkeith Road, Edinburgh, 9

National Foot Health Week

During the second National Foot Health Week, which is to be held this year from June 16 to 21, there will be a four-day exhibition at the Army & Navy Stores, Victoria Street, London, S W 1, with a special section on "Women at Work" A series of popular lectures will also be given. Further particulars may be had from the press office, 121, Ebury Street, S W 1

CORRIGENDUM *Accidental Spinal Injection of Xylocaine* —In some copies of last week's issue the words "hypobaric," "isobaric," and "hyperbaric," contained in Dr H Barrie Fairley's letter (p 316) were mis-spelt

Oxygenaire Ltd.—This company's London telephone number has been changed to Welbeck 4477

Births, Marriages, and Deaths

BIRTHS

BUXTON —On Feb 5, at Los Angeles the wife of Dr Nigel Buxton, of Upton House, Cromer—a daughter

EPSTEIN —On Feb 5, in London the wife of M. A Epstein, M.A., M D —a daughter

FOREMAN —On Feb 2, the wife of Dr H M Foreman, of Dinas Powis Glamorgan—a daughter

HELPS —On Feb 8, in London the wife of Dr E P W Helps —a daughter

STRACH —On Feb 8 at Wigan, the wife of Mr E H Strach, F R.C S —a daughter

MARRIAGES

ALTON—OSBORNE —On Nov 22, at Carson City, Nevada, U S A , Harry Alton, M.D of San Francisco, U S A , to Mahmea Enid Lolita Osborne

HENDRIE—OAKLEY EVANS —On Feb 8, in London, John Hendrie, L.R.C P E to Sylvia Hildred Oakley Evans

MILLER—FERGUSON —On Feb 9 Robert F Miller, M.B of Paisley, to Sheila Vida Ferguson

PENDER—MACKLIN —On Feb 9, in London, Bruce Wolfe Tresilian Pender, F R C.S to Jean Helen Macklin

DEATHS

BODINGTON —On Feb 5, at Winchester, Arthur Eaton Bodington, M D Camb aged 87

FRASER.—On Feb 7 at Hove Charles Fraser M D Edin , aged 79

HOWARD TRIPP —On Feb. 2 Charles Llewellyn Howard Tripp M.R.C.S late of Bude, Cornwall aged 94

O'NEILL.—On Feb 2, Charles Sefton O Neill O.B E , M.D Manc., of Hale Cheshire aged 70

POLLARD —On Jan. 29 at Edgbaston, Walter Henry Pollard M B Lond aged 84

SCOTT —On Feb 4 at Truro Cornwall, Frank Scott, M.B Lond., aged 68

Diary of the Week

FEB 17 TO 23

Monday, 18th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W 1
8 30 P M Mr R C Brock Surgery of the Heart and Great Vessels (First of three Lettsomian lectures.)

Tuesday, 19th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene, Keppel Street, W C.1) Sir Robert Robinson, O.M., F R.S Chemical Aspect of Antibiotics

INSTITUTE OF DERMATOLOGY, St John's Hospital, Lisle Street, W C 2
5 30 P M Dr P D Samman Parapsoriasis and Poikiloderma Atrophicans Vasculare

WEST END HOSPITAL FOR NERVOUS DISEASES, 40, Marylebone Lane, W 1
5 30 P M. Dr N G Hulbert Neurology demonstration.

MIDDLESEX COUNTY MEDICAL SOCIETY
3 P.M (North Middlesex Hospital, Silver Street, N 18) Dr I S Collins A Syndrome resembling Hæmophilia due to a Circulating Anticoagulant.

Wednesday, 20th

UNIVERSITY OF LONDON
5 30 P M (Institute of Education, Malet Street, W C.1) Mr J H Schulman, SC D Molecular Interactions at Interfaces (First of three lectures in pharmacy)

INSTITUTE OF DERMATOLOGY
5 30 P M Dr R W Riddell Mycology—Treatment of Fungus Infections

Thursday, 21st

UNIVERSITY OF LONDON
5 30 P M (Institute of Education.) Dr Schulman Molecular Interactions at Interfaces (Second of three lectures in pharmacy)

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W C 2
5 P M Dr S P Meadows Carotid-cavernous Aneurysms and Pulsating Exophthalmos (Hunterian lecture)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene) Prof H D Kay, D SC., F R.S *Recent Light on Mammary Function.*

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE
7 30 P.M. (26, Portland Place, W 1) Prof. P A Buxton, F R.S Insecticides

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W 1
8 P M Mr R W Stanford, Mr S B Osborn, Mr Alma Howard, PH.D The Genetic Hazard of Diagnostic Examination.

INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Great Ormond Street, W C 1
5 P M Mr T Holmes Sellors Patent Ductus Arteriosus and Pulmonary Stenosis

ROYAL ARMY MEDICAL COLLEGE, Millbank, S W 1
5 P.M. Dr W Russell Brain, P.R.C.P The Neurology of the Cervical Spine

ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, S W 1
4 30 P M Neurology demonstration

MANCHESTER MEDICAL SOCIETY
4 30 P M (University of Manchester) Dr D Evan Bedford The Art of Feeling the Pulse

LIVERPOOL MEDICAL INSTITUTION 114 Mount Pleasant, Liverpool, 3
8 P.M Prof Andrew Wilson Myasthenia Gravis

UNIVERSITY OF ST ANDREWS
5 P.M. (Medical School, Small's Wynd, Dundee) Prof. F H Bentley Management of Massive Gastroduodenal Bleeding

Friday, 22nd

UNIVERSITY COLLEGE, Gower Street W C 1
5 30 P M Mr F Bergel, D.SC British Contributions in the Field of Pharmaco therapeutics

INSTITUTE OF DERMATOLOGY
5 30 P M Dr Samman Reticuloses—clinical demonstration.

INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY
5.30 P M (London School of Hygiene) Dr Graham Hayward *Patent Ductus Arteriosus and Coarctation.*

BRITISH INSTITUTE OF RADIOLOGY
5 P M Meeting of medical members.
6 30 P M Mr H A. B Simons PH D Use of Nuclear Research Emulsions for Fast Neutron Dosimetry

MANCHESTER MEDICAL SOCIETY
4 30 P M (University of Manchester) Professor Klein (Strasbourg) Steroid Hormones and Behaviour

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EMERGENCY BED SERVICE.—In the week ended last Monday applications for general acute cases numbered 1209 The proportion admitted was 85 5%

"Fougasse," chairman of the Universities Federation for Animal Welfare (UFAW), is to broadcast an appeal for the funds of the federation on Sunday, Feb 24, at 8 25 P.M. Behind the notable pencil name stands the editor of *Punch* and behind him again is Mr Kenneth Bird, whose friendship for animals goes deeper than mere pleasure in a variety of spirited models

THE GERIATRIC PROBLEM IN MENTAL HOSPITALS

L C Cook
M.D. Camb D.P.M.
PHYSICIAN SUPERINTENDENT BEXLEY HOSPITAL, KENT
ASSOCIATE PHYSICIAN DEPARTMENT OF PSYCHOLOGICAL MEDICINE, GUY'S HOSPITAL, LONDON

E Cunningham Dax
M.B. B.Sc Lond. D P M.
CHAIRMAN MENTAL HYGIENE AUTHORITY STATE OF VICTORIA; LATELY MEDICAL SUPERINTENDENT NETHERNE HOSPITAL, COULSDON, SURREY

W S Maclay
O.B.E., M.D Camb M.R C.P, D.P.M.
MEDICAL SENIOR COMMISSIONER, BOARD OF CONTROL

On Jan 1 1938, there were just over 23 000 patients aged 65 years and over in the public mental hospitals of England and Wales. Ten years later there were nearly 31,000 These figures alone show cause for alarm which more detailed investigation does nothing to mitigate.

The nature and extent of the problem is quickly seen by referring to tables I–III Table I shows the total population and the population of persons aged 65 years and over in England and Wales in mid 1938, and at the end of 1947 and 1948 While the total population has increased in the ten year period by less than 2½ million (6·0%) the population aged 65 years and over has gone up by more than 1¼ million (31·4%), and the proportion of people in this age-group has risen from 7 8 to 9 3% of the total population in men and from 9 5 to 12 2% in women According to the Royal Commission on Population (1949) as many as 16% of the population are likely to be 65 years and over in 1977 We should expect this to be reflected in the number of old people in and awaiting admission to hospital, but the actual figures show a much steeper rise, both in the number aged 65 years and over admitted to the mental hospitals (table II) and in the total number of such patients in these hospitals (table III) It is noteworthy that the proportion of men admitted in this age group has increased by 1 7% in the ten year period 1938–48 which is only slightly more than the increase (1 5%) of men of 65 and over in the total population whereas the proportion of women in this age-group who were admitted has increased by 5% which is nearly double the increase (2 7%) of women in the same age-group in the total population (tables I and II)

It will be seen from table III that in the ten year period 1938–48 the total mental hospital population fell by 3135 patients, largely because fewer beds were available; whereas the number of patients of 65 and over increased during the same period by 7674 This constitutes a fall of 10,809 patients under the age of 65 which cannot be accounted for by lack of suitable patients under this age; in fact many mental hospitals are forced to postpone or even refuse admission to voluntary patients likely to benefit from treatment in order to admit the certified patients allotted to them The proportion of patients of 65 and over in the total mental hospital population rose from 14 8 to 19 1% in men, and from 10 7 to 27 6% in women—a steeper rise, especially in women than that found in the general population (table I)

TABLE I—PROPORTION OF ELDERLY IN THE POPULATION OF ENGLAND AND WALES IN 1938, 1947 AND 1948

Date	Total population			Population aged 65 years and over			Population aged 65 and over: total population		
	M	F	Total	M	F	Total	M	F	Total
							%	%	%
Mid-1938	19 792 000	21 423 000	41,215 000	1,543 100	2 031 800	3,574,900	7 8	9 5	8 7
Dec. 31 1947	20 900 000	22 300,000	43 200 000	1 933 000	2 661 000	4,597 000	9 2	11 9	10·6
Dec. 31 1948	21 187 000	22 480 000	43,670 000	1,963 000	2 731 000	4 02 000	9 3	12 2	10·8

Causes of the Rise

This alarming rise has four causes:

1 The increasing age of the general population.
2 The loss of over 3000 beds by the mental hospitals
3 The loss of beds for elderly patients in public-assistance institutions and other hospitals and institutions
4 Social factors

AGEING OF THE POPULATION

The increase in age in the general population is magnified in the mental hospital population partly because very few mental hospital patients are under the age of 10 and partly because psychiatric illness tends to be more common in the elderly

Landis and Page (1938) have shown that in the United States of America at the time when they were writing only 22 per 100 000 individuals between the ages of 15 and 19 were admitted for the first time to mental hospitals as compared with 66 for age group 30–34 82 for age-group 45–49 114 for age group 65–69 and 226 for age group 75 and over They noted that this does not hold good for European countries where the first-admission rates either level off or decrease with age Fig 1 shows that, although this was true of England and Wales in 1938 the curves for 1948 tend to lose their downward trend with the advancing age of patients and to approximate to the American pattern Landis and Page suggested that the discrepancy between the U.S.A and Europe might be due to the fact that in the U S.A. the aged with mental aberrations were sent to mental hospitals, while in Europe they were placed in special institutions for the aged or cared for in the community Diminished accommodation in special institutions, and less care in the community during recent years would similarly explain the changes in the 1948 curve and are undoubtedly important factors in the rising proportion of old people in mental hospitals in this country

TABLE II—ADMISSIONS TO FORMER COUNTY AND BOROUGH MENTAL HOSPITALS IN 1938 AND 1948

Date	Total			Aged 65 and over			Patients admitted aged 65 and over: total admissions		
	M	F	Total	M	F	Total	M	F	Total
							%	%	%
1938	11,660	15 477	27 137	1481	1882	3363	12·4	12·2	12 3
1948	19 230	26 420	45 659	2718	4562	7280	14 1	17 2	16·0

LOSS OF MENTAL HOSPITAL BEDS

Mental hospital beds were reduced as a result of war conditions, by over 3000 Since senile patients are, for the most part certified and must be accepted at the expense of uncertified patients, mainly younger this loss

TABLE III—POPULATION OF FORMER COUNTY AND BOROUGH MENTAL HOSPITALS IN 1938 AND 1948

Date	Total population			Population aged 65 and over			Residents aged 65 and over total residents		
	M	F	Total	M	F	Total	M	F	Total
Jan 1 1938	58,641	73,311	131,952	8673	14,478	23,151	% 14 8	% 19 7	% 17 5
Jan 1 1948	55,240	73,577	128,817	10,533	20,292	30,825	19 1	27 6	23 0

of beds has also been in some measure responsible for the relative increase of elderly patients

LOSS OF OTHER BEDS FOR ELDERLY PATIENTS

It has not been possible to obtain comprehensive figures for the loss of beds in public-assistance institutions, general hospitals catering for elderly and senile patients, *and accommodation under part III of the National* Assistance Act, but it is well known that many such beds, available before the war, are now closed because of war damage, lack of nurses, or the need for economy, or because they are being used for other purposes Thus in the South-East Metropolitan region the number of beds for the elderly and chronic sick in the former local authority hospitals and institutions fell from 3733 in 1938 to 2472 in 1948

Any estimate of how many of the elderly and aged now in mental hospitals are suitable for other accommodation must be influenced by the personal bias of the assessor, but the following figures taken from two different sources leave no doubt that an appreciable proportion of patients are suitable for these lost beds and are of the type accommodated in them before the war

In the South-Western region, with a mental hospital population of 10,200, it has been estimated that out of 2991 patients aged 65 or over, 743 (25%) could be housed elsewhere than in a mental hospital This figure constitutes 7 3% of the total mental hospital population of the region In a similar survey undertaken in the South East Metropolitan region in 1948, a slightly higher proportion of elderly patients were considered suitable for geriatric beds or beds for the chronic sick

SOCIAL FACTORS

The influence of social factors on the admission to mental hospitals of old people cannot be given in statistical form, but there is no doubt that far fewer families than before the war are now able or willing to care for their mentally or physically ailing old people in their homes Among the main social factors are lack of adequate housing, increased employment of women, the stopping of maintenance contributions under the National Health Service Act, and the decline of family, religiou and social obligations

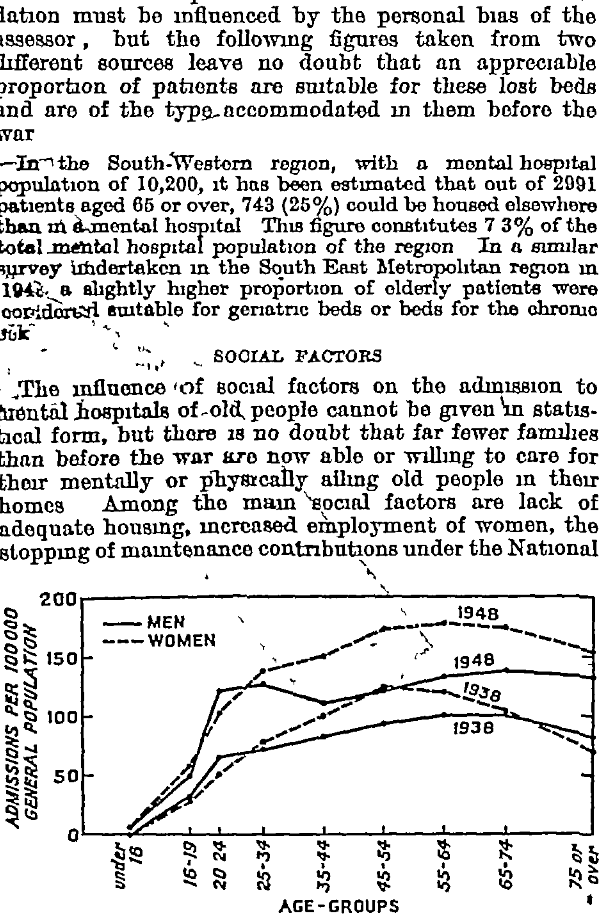

Fig 1—Number of direct admissions to former county and borough mental hospitals during 1938 and 1948, by age and sex expressed as ratio per 100 000 of corresponding general population for mid 1938 and for 1948 respectively

The very large proportion of women, and particularl of married women, now going out to work constitut perhaps the most important social factor of all, for the are many senile patients in every mental hospital wh could be discharged if there were a woman relative a home the greater part of the day Moreover, now th families are smaller it is often economically impossib for one unmarried daughter to stay at home to loo after aged parents

The stopping of all maintenance contributions und the Act, combined with the ever-rising cost of living, ma well have made many families less willing to keep the aged relatives at home, and more obdurate against havin them back from a mental hospital The falling standard of family unity and the lessening of the prejudice again mental hospitals have encouraged the decline of famil responsibility towards elderly relatives Waning religiou influences, and educational and political teaching whic foster the idea of a welfare State, are also importan factors

Elderly Patients in Six Hospitals

We give here the findings in a detailed inquiry in admissions of patients aged 65 and over, to s representative mental hospitals (table IV)

The figures for the 1947 admissions were used, so th the history of each patient could be followed for tw years after entering the hospital. For each hospital t figures for the admissions of men and women we obtained, together with the deaths, discharges, a numbers remaining after six weeks, six months, one yea and two years

ADMISSIONS

A total of 510 patients aged 65 and over were admitte representing 7% of all admissions of patients aged and over to mental hospitals in England or Wales duri 1947 The highest number of admissions (192) was to hospital in a county with poor institutional accommod tion, without female observation wards and with on 10 male observation beds for about $1^1/_2$ million inhab tants The lowest number of admissions (25) was to hospital in a large city with plentiful observation-wa and chronic hospital facilities

In all the hospitals, the female admission-rate w higher than the male The ratio of male to fema admissions was 1 2 05, which is a lower ratio than th found throughout the country in 1947, this being 1 1 for patients aged 65 and over

DEATHS

In the six hospitals for which the figures were examine the death-rates in this age group were 5–25% of th admissions during the first six weeks, 10–38% in the fir six months, 12–42% in the first year, and 12–40% two years after the patients entered hospital T hospitals in the series fall into two groups, three wi about 5500 beds (group I) dealt with 392 of the admi sions, the other three, with over 6000 beds (group I dealt with 118 admissions between them, which sugges that they were backed by a more adequate supply observation wards and institutions for the reception elderly patients It was found that in six weeks group had nearly three times the death rate of group II, b that in six months the rate had declined to just ov twice that of group II, and in two years to slightly le than twice It therefore seems likely that there is considerable difference in the number of deaths, part cularly early deaths, if some categories of patients a sorted out before admission

Taking all the figures together, of the 510 admissio 95 (19%) died in six weeks, 146 (29%) in six month 171 (33%) in one year, and 202 (40%) within two yea of their entry into hospital Putting this another wa

TABLE IV—FATE OVER 2 YEARS OF PATIENTS AGED 65 AND OVER, ADMITTED TO 6 MENTAL HOSPITALS IN 1947

	Group I (3 hospitals)			Group II (3 hospitals)			Grand totals		
	M	F	Total	M	F	Total	M	F	Total
Admissions in 1947	136	256	392	31	87	118	167	343	510
After 6 weeks:									
Dead	39 (*29*)	47 (*18*)	86 (*22*)	6 (*19*)	3 (*3*)	9 (*8*)	45 (*27*)	50 (*14*)	95 (*19*)
Discharged	18 (*13*)	19 (*7*)	37 (*9*)	2 (*6*)	8 (*9*)	10 (*8*)	20 (*12*)	27 (*8*)	47 (*9*)
Remaining	79 (*58*)	190 (*74*)	269 (*69*)	23 (*74*)	76 (*88*)	99 (*84*)	102 (*61*)	266 (*78*)	368 (*72*)
After 6 months									
Dead	52 (*38*)	76 (*30*)	128 (*33*)	8 (*26*)	10 (*11*)	18 (*15*)	60 (*36*)	86 (*25*)	146 (*29*)
Discharged	36 (*27*)	87 (*34*)	123 (*31*)	6 (*19*)	31 (*36*)	37 (*31*)	42 (*25*)	118 (*34*)	160 (*31*)
Remaining	48 (*35*)	93 (*36*)	141 (*36*)	17 (*55*)	46 (*53*)	63 (*54*)	65 (*39*)	139 (*41*)	204 (*40*)
After 1 year									
Dead	62 (*46*)	88 (*34*)	150 (*38*)	8 (*26*)	13 (*15*)	21 (*18*)	70 (*42*)	101 (*29*)	171 (*33*)
Discharged	45 (*33*)	102 (*40*)	147 (*38*)	7 (*22*)	38 (*44*)	45 (*38*)	52 (*31*)	140 (*41*)	192 (*38*)
Remaining	29 (*21*)	66 (*26*)	95 (*24*)	16 (*52*)	36 (*41*)	52 (*44*)	45 (*27*)	102 (*30*)	147 (*29*)
After 2 years									
Dead	72 (*53*)	103 (*40*)	175 (*44*)	10 (*32*)	17 (*20*)	27 (*23*)	82 (*49*)	120 (*35*)	202 (*40*)
Discharged	49 (*36*)	107 (*42*)	156 (*40*)	11 (*36*)	39 (*44*)	50 (*42*)	60 (*36*)	146 (*43*)	206 (*40*)
Remaining	16 (*12*)	45 (*18*)	61 (*16*)	10 (*32*)	31 (*36*)	41 (*35*)	26 (*16*)	76 (*22*)	102 (*20*)

Figures in italics and parentheses are percentages

19% of the patients in this age-group admitted to hospital lied in the first six weeks, a further 10% died between ix weeks and six months after admission, a further 4% etween six months and a year, and a further 7% etween one year and two years. Dividing these figures nto sexes the results are most striking, for they show hat in the first six weeks the male death rate was almost wice as great as the female 27% of the men admitted lied in this period as opposed to 14% of the women, ut thereafter there was little difference in the death ates of the sexes.

DISCHARGES

For the 510 admissions to all six hospitals the dis harges were 47 (9%) during the first six weeks, rising apidly to 160 (31%) in the first six months then com aratively slowly to 192 (38%) in a year and 206 (40%) n two years. The discharge rate is unexpectedly high if judged by the somewhat pessimistic standard commonly adopted for elderly patients. The discharge-rates are almost identical in each of the two groups of hospitals for all the periods over which they were examined but they cannot be taken at their face value, because with group II hospitals allowance must be made for more observation ward deaths and discharges, and for the selection of cases for care in other hospitals.

In all the hospitals, taken together the male death rate is considerably higher than the female death rate in the first six weeks, and thereafter they are about equal but the female discharge-rate, on the other hand is appreciably greater throughout the two years (except during the first six weeks but the numbers available for this period are not large enough to be significant) Further inquiries are necessary to discover the reasons for these differences.

Some Published Recommendations

Our recommendations are formulated on the framework of the circulars of the Ministry of Health (1950a and b) on the Treatment of the Elderly Chronic Sick and on the Care of the Aged Suffering from Mental Infirmity and on the reports of the B M.A special committees (British Medical Association 1947) on the Care and Treatment of the Elderly and Infirm

The circular on Treatment of the Elderly Chronic Sick suggests the principles on which a hospital geriatric service should be developed, and recognises convalescent and long-stay annexes for the elderly sick no longer in need of active hospital treatment It suggests that this accommodation might be in a separate part of a larger hospital in special hospitals, or in annexes or homes linked with an acute hospital Admissions should be only by way of the acute hospitals, and the nursing staff should be linked with the acute hospital to allow for a rotation of staff and minimise the difficulty in obtaining nurses for chronic cases

The circular on the Care of the Aged suffering from Mental Infirmity contemplates the provision of short-stay psychiatric units and long stay annexes

The short-stay unit is envisaged as a small observation and investigation unit (with not above 25 beds usually) developing as a part of the main geriatric department which it is hoped to form in all the larger general hospital centres. It is mainly a sorting house in which patients should not be kept more than six weeks. During this period some may die some may become fit to go home a few may require mental hospital care and the rest will be transferred to the long-stay annexes (Some may be found suitable for accommodation under part III of the National Assistance Act)

The long stay annexes are intended for patients without marked behaviour disorder and might be grouped either with mental hospitals or general hospitals, or hospitals for the chronic sick They should not in any case be a part of a mental hospital, and the patients would of course be under no kind of certification or order Medical care should be supervised by a psychiatric consultant.

Admission to the long-stay unit would be from the short-stay unit, and perhaps also from mental hospitals, observation wards under section 20 of the Lunacy Act, or direct from home It is suggested that unused buildings on mental hospital estates, former public assistance institutions, or large houses might be used. The problem of obtaining nurses for the long-stay units is not touched upon in this circular, although it is laid down that the staff should include mental nurses The report of the Standing Advisory Committee on Mental Health (1949) however on which the circular is based, specifically recommended that the annexes should be grouped with mental hospitals and that the nursing staff should be derived from the linked mental hospital

These recommendations were partly based on the B.M.A committee s report referred to above, and agree with it in broad plan The chief differences are:

(1) The Ministry circular applies its recommendations to patients aged 65 and over whereas the B.M.A. report envisages a geriatric service for patients over 60

(2) The B.M.A. committee propose that the long stay annexes should be in effect an extension of the geriatric department and the patients should be admitted to them from no other source The Ministry circular allows admission of patients from other sources, and in fact the Standing Advisory Committee on Mental Health put forward cogent arguments for admission, in some instances, from mental hospitals or direct from home

Recommendations and Discussion

For the purposes of this investigation we have defined geriatric patients as those aged 65 years or over because

65 years is one of the age-group limits in the Board of Control returns, and many of our figures have been obtained from this source In practice there is no overriding reason to make a definite age limitation

LONG-TERM RECOMMENDATIONS

We agree with the main conclusions of the B M.A Committee and the Ministry of Health that short-stay and long stay units should ultimately be provided

Short stay Units

In our opinion short-stay units should be an integral part of a general hospital and of its geriatric department They should be administered by the group hospital management committee, visited by a consultant psychiatrist and nursed by the ordinary nursing staff of the general hospital, with a doubly trained sister in charge, and preferably one or more (according to size) mental-trained nurses in support

The unit should have small wards with adequate single room accommodation It should admit patients from the main hospital, from the geriatric department, and direct from their homes Patients obviously requiring mental-hospital care should be admitted, as at present, direct to an observation unit or mental hospital Disturbed behaviour alone should not be a bar to admission, for many old people settle down within a few days with skilled medical and nursing care

Is the suggested maximum period of six weeks the most desirable period for patients to stay in these units ? In our analysis it was found that out of the total of 510 patients aged 65 and over admitted to six hospitals, 19% died within six weeks, 9% were discharged, and 72% remained In six months, however, 29% had died, 31% were discharged and only 40% remained After a year 29% remained in hospital and after two years 20%

The rate of decline of the total numbers left in hospital, and how this is accounted for by the discharges and deaths, is shown in fig 2 It is unfortunate that the figures after three months were not obtained, but there can be no doubt that the relative rate of decline in numbers of patients remaining in hospital is very much greater in the first six months than in the succeeding period

Post (1951) deals with 214 patients admitted to a mental observation ward in 1946 who were over the age of 60, as opposed to our own mental-hospital series aged 65 and over in 1947 He found that in three months almost half his patients had been discharged or had died, but his percentage of deaths in the first three months was almost equal to those in our series after six months, while his discharges were about the mean of our six-week and six-month percentages It appears, therefore, that the death-rate of the patients he studied was, in the first three months, higher than that in our series Also the discharge-rate was lower, if it can be assumed that patients over 60 years have as good or better chance o discharge than those aged 65 years and over in the firs three months of their illness If these figures can b applied to our series of cases it seems that the rate o fall of the numbers remaining in hospital is not muc more rapid in the period between six weeks and thre months than it is between three months and six month

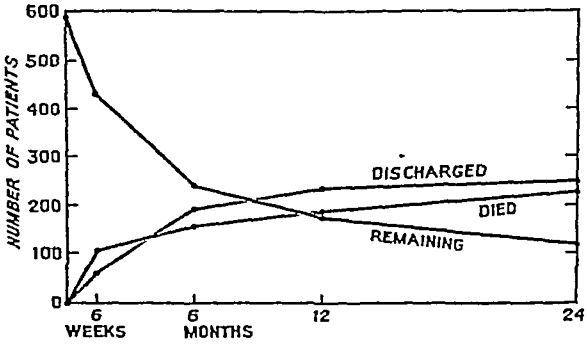

Fig 2—Deaths and discharges of patients aged 65 and over, and decline in numbers of those remaining in hospital

TABLE V—NUMBERS OF DEATHS OF PATIENTS AGED 65 AN OVER IN 5 MENTAL HOSPITALS IN 1947 COMPARED WITH TH NUMBERS EXPECTED, AS CALCULATED FROM FIGURES FO THIS AGE GROUP IN THE RETURNS OF THE REGISTRAR GENERAL

Period after admission	Male		Female	
	Expected	Actual	Expected	Actual
0–6 wks	2	45	2	51
0–6 mos	7	61	10	84
0–1 yr	15	71	21	99
6 wks –6 mos	5	16	8	33
6 mos –1 yr	8	10	11	15

It is interesting to speculate what would have happened if the 7280 patients aged 65 and over who wer admitted in 1947 direct to mental hospitals had instea gone into short-stay geriatric units If we apply ou percentage figures for discharges and deaths (which ar supported by the figures of Post) we find that after si weeks 2038 would have been discharged or died, and tha between six weeks and six months this number woul have increased by another 2330, but between si months and one year only a further 800 would have bee discharged or have died, and in the next year no mor than 656

The decision has to be made as to the best length o time for these elderly patients to remain in the geriatri observation unit It seems clear that the most rapi death rate occurs in the first six weeks, and indeed som figures obtained from the Registrar-General on thi point are illuminating (table v)

Assuming that the cases from our six hospitals forme a representative sample of patients aged 65 and ove admitted to all the mental hospitals in the country, the the ratio of deaths expected for the general public to thos found after admission to the mental hospitals can b calculated, as follows

Period after admission in which death occurred	*Deaths of general population deaths of mental hospital populatio*
0–6 weeks	1 24
6 weeks–6 months	1 3 8
6 months–1 year	1 1 3

The number of patients who died within a year can usefully be compared with the numbers discharged, when it becomes clear that whereas the greatest number of deaths occur up to six weeks after admission, the greatest number of discharges take place between six weeks and six months

Period after admission in which death or discharge occurred	*Deaths*	*Discharge*
0–6 weeks	103	60
6 weeks–6 months	56	132
6 months–1 year	27	40

If the function of the short stay units is to retain the patients for the period in which the greatest number of deaths will occur in the shortest time, probably six weeks or less is the time of choice This would have the advantage of lowering the mortality-rate amongst those admitted to mental hospitals or long stay geriatric units It would, however, have the drawback that most of the recoverable patients would be moved twice (and removes are never well tolerated in the elderly), and that in the mental hospital they would probably be further from home, and less often visited If, on the other hand, it is intended that most of the patients who are recoverable should also be discharged from the same units, then six weeks is obviously too short a time for them to stay For this purpose the optimum length of stay is between six weeks and six months, probably three or four months.

It seems from our evidence and also from Post's figures, that the proposed maximum period of six weeks is not long enough; but it must be noted that the maintenance rate in the small short-stay annexe is likely to be considerably greater than in the larger mental hospital or long stay geriatric units

Long stay Units

Administration and Staffing—We do not want to advocate that the mental health service should shelve any of its proper responsibilities, but we think the care and treatment of patients exhibiting simple cerebral deterioration due to age should be shared by the general hospitals. We suggest that the long stay unit should be administered from either a general or mental hospital group but should always be under the clinical supervision of a consultant psychiatrist and preferably should have a doubly trained sister in charge Its junior nurses should be drawn from both general and mental hospitals, with perhaps a greater proportion of assistant nurses or ward orderlies than in the acute wards. All student nurses should serve there for a short training period We do not consider it feasible or desirable to provide the bulk of the nursing staff for these units from mental hospitals; the units should rather be attached to teaching hospitals (with which the main geriatric departments will presumably be linked) or to other hospital groups with flourishing nurse training schools. Only by this means are enough nurses likely to be obtained to make the scheme practicable (Ministry of Health 1950a) In this connection we strongly endorse the view of the Standing Advisory Committee on Mental Health that the Standing Nursing Advisory Committee should be asked to consider the desirability of including geriatric instruction in nurse training especially as the nursing care of the elderly and chronic sick provides some of the most valuable lessons a nurse can learn

There is much to be said in favour of fairly large units (200 beds and over):

1 They can provide better facilities for entertainment recreation and occupational therapy than smaller units

2. They are more economical.

3 Administration and the provision of medical consultants psychiatric social workers, physiotherapists, and occupational therapists are likely to be easier

Homeliness can be ensured by having small dormitories and sitting rooms, and the unit should be *divided* into ambulant and sick divisions. There should be an adequate number of single rooms.

Type of Patient—Long stay units should house elderly and senile patients suffering from mental deterioration of too great a degree for care in part III National Assistance Act accommodation In the main they will be somewhat amnesic and confused but not chronically noisy or disturbing to others. Occasional bouts of irritability restlessness, or talkativeness should not be a bar nor should physical deterioration requiring confinement in bed

Sources of Admission—Patients should be admitted, with the approval of the consultant psychiatrist supervising the unit mainly from the short-stay units, but also direct from their homes, from mental hospitals, and from other hospitals and institutions, including observation wards. We do not agree with the conclusions of the B.M.A committee that all patients *must* first go through the short stay unit

IMMEDIATE STEPS

Neither these recommendations nor those of the B.M.A committee or Ministry of Health are immediately practicable for they involve the erection of new buildings, or the purchase major adaptation or reinstatement of existing buildings, or both as well as the provision of more and more nurses. These measures are prohibited at present by the economic and labour situation and the prospect of early improvement in either looks far from hopeful We therefore make the following short-term suggestions, which might help to alleviate the present burden until more permanent schemes can be fulfilled

1 In order to reduce admissions of senile patients to hospitals and institutions

(*a*) More advice should be made available to general practitioners in the care of this type of patient and particularly in the more practical use of sedatives, especially at night. This could be done by means of domiciliary visits, by appointing more geriatric medical officers and by the issue of Ministry of Health pamphlets discussions at local B.M.A meetings, and the better training of medical students in geriatrics

(*b*) More use should be made of psychiatric social workers and other welfare officers in persuading families to look after their own kin in helping them to do so with the least possible disarrangement of their lives and in educating them in their responsibilities

(*c*) More practical use should be made of health visitors district nurses and home helps This requires genuine coöperation between the local authority and the social worker or geriatric medical officer Geriatric medical officers could help general practitioners with advice on the management and disposal of senile patients they could also save many domiciliary visits and telephone consultations, and prevent unnecessary admissions to mental hospitals.

(*d*) Social clubs sometimes called Darby and Joan clubs have proved very successful in alleviating the loneliness and boredom which so often precipitates mental breakdown in old people Some local authorities have already recognised their responsibilities in this direction and administer flourishing social clubs for old people but in many districts there are none This work needs kindliness and common-sense even more than academic training and therefore provides the finest opportunities for the services of voluntary helpers. The advice of psychiatric social workers and occupational therapists where available, would be of additional benefit

2 Hospital or institution wards closed for lack of nurses should be attached to teaching hospitals (or other hospitals which are well off for nurses) and reopened for geriatric patients, the nursing staff being provided by the linked hospital

3 It should be heavily stressed that units for geriatric patients (whether physically or mentally affected) should be an integral part of the main hospital and that it should be a part of the general nurses' ordinary duties to be posted there in their turn The need for this in regard to the general hospital geriatric services has been recognised by the Ministry (Ministry of Health 1950a)

4 As suggested by the Standing Advisory Committee on Mental Health geriatric nursing should have an official place in a nurse's general training, and all student nurses should spend part of their training in a geriatric unit This alone can upgrade the nursing of geriatric patients in the manner so greatly needed and at the same time it would give the nurse valuable experience. We fully realise how difficult it often is for matrons to staff the various units under their care, but their coöperation without which no geriatric scheme can succeed can surely be anticipated as soon as geriatric nursing is officially recognised as an essential part of a nurse's training

5 The maximum number of beds possible should be put up in old peoples wards, even though it will cause

overcrowding Some arguments against this are that it is a retrogressive step, that the nurses would be overworked and would resign or become ill, and that the patients would be less comfortable and more prone to infections But we must be practical and temper our remedies to the gravity of the situation It is more economical, both in nursing power and money, to treat—say—60 patients in two wards, than the same number in three wards We are forced, in any case, to overcrowd in the mental hospitals, and senile patients have proved to be the patients least affected by this, they are less sensitive than younger people to the common infectious illnesses, and owing to their interests being so much narrower and their movements more limited, their conduct and comfort are relatively little affected This final recommendation must not be misinterpreted to suggest that we advocate a lower standard of care or comfort for the elderly Companionship, comfort, kindliness, and patient understanding are, if anything, more essential to the elderly, who have so often outlived most of their relatives and friends, than to young people, and should be the keynote of all geriatric planning

We are grateful to the Ministry of Health, the Board of Control, the Registrar General, the regional psychiatrists of the South East Metropolitan and South Western regions, and to the medical superintendents of Three Counties, Cane Hill, Lancaster Moor, Netherne, St Augustine's, and Winson Green Hospitals, for supplying much statistical information. We are especially indebted to the council of the Royal Medico-Psychological Association and to the other members of its ad hoc geriatric committee for allowing us to use their report as a basis for this paper

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SUBACUTE THYROIDITIS

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SUBACUTE thyroiditis is a distinct clinical type of non bacterial inflammation—distinct both from Riedel's fibrous thyroiditis and from Hashimoto's lymphadenoid thyroiditis It was first studied by de Quervain (1904) and later classified by de Quervain and Giordanengo (1936)

The term "acute thyroiditis" probably is better reserved for those cases in which an inflammatory thyroid swelling subsides in two or three weeks, as described by Bauchet (1857) in his classical monograph These cases may be of different cause

The term "giant-cell or pseudotuberculous thyroiditis" has been used by pathologists to describe the histological characteristics found in subacute thyroiditis which has also mistakenly been called Riedel's disease deCourcy (1943) operated on 2 cases of probable subacute thyroiditis and suggested that the histological appearances of perithyroiditis confirmed his diagnosis of Riedel's struma

The cause of subacute thyroiditis is not known In this country the syndrome is not common Crile and Rumsey (1950) think that it is often missed because the characteristic clinical picture is not widely known. In Crile's clinic during two recent years they recognised 38 cases, but only twenty seven cases were seen in the preceding ten years Giordanengo in 1938 found only 54 cases published since de Quervain's original description in 1904

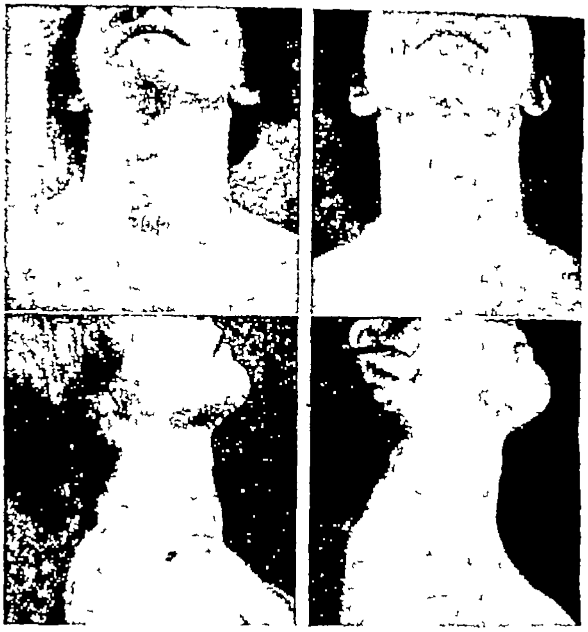

Fig 1—Subacute thyroiditis (case 2): a, before treatment with thiouracil (44th day of disease); b, after remission (57th day after end of 12-day course of thiouracil)

Subacute thyroiditis is a self limiting disease, the symptoms subside over a period varying from a few weeks to months Rapid relief may be obtained by medical treatment Crile and Rumsey (1950) used X rays, and King and Rosellini (1945), Cantwell (1948), and Harvill (1948) obtained successful results with thiouracil In view of the rarity of this syndrome we report here 3 cases in which various measurements of thyroid function were made and a rapid remission was observed after short courses of thiouracil

CLINICAL OBSERVATIONS

The clinical picture in these 3 patients was typical There was an acute onset of sore throat with general malaise In cases 1 and 2 there was an associated head cold lasting a week, in case 1 after the sore throat, and in case 2 before it The pain felt in the thyroid region radiated behind the ear, and was aggravated by swallowing and movement of the neck All 3 patients first consulted us, more than a month (38, 46, and 57 days) after the onset, because of the persistence of the sore throat and malaise, only case 1 also noted resting tachycardia and palpitations with dyspnœa on effort When first seen all 3 patients felt fatigue and malaise, and showed fever (99° or 100° F), a raised erythrocyte-sedimentation rate (E S R) 40, 37, and 83 mm in 1 hr (Westergren) The results of thyroid palpation were similar in the 3 patients, except that in case 2 the abnormalities were found only in the right lobe and isthmus, in this patient the condition had started in the left lobe, which had already largely subsided The thyroids were diffusely enlarged to about twice normal size, tense, very tender, non adherent, smooth, and free from nodules In all the patients white cell counts were normal and throat swabs yielded no pathogens Fig 1 illustrates the thyroid-swelling of case 2 and her appearance after it had subsided

MEASUREMENT OF THYROID FUNCTION

No case showed any clinical evidence of thyroid retory dysfunction except possibly case 1, which had a ting tachycardia and loss of 12 lb in weight during illness; but the patient's basal metabolic rate M.R.) and plasma-cholesterol levels were normal e table I) In cases 2 and 3 clinical examination was rmal, as also were the B.M.R. plasma-cholesterol d protein bound iodine, indicating normal secretory ivity In contrast with this normal secretory activity, ne of these 3 thyroids took up any measurable iodine ring radioactive iodine tests so hormone formation s in abeyance Over 90% of the administered dose of lioactive iodine appeared in the urine in forty-eight urs, *and the local thyroid measurement made on* se 3 found less than 1% of the iodine dose held in the yroid after forty-eight hours

The capacity to concentrate iodine was rapidly and mpletely restored after short courses of thiouracil. se 3 showed a normal uptake of radioactive iodine, own by urinary excretion on the twenty fifth day ter starting a methyl thiouracil course which had *cluded only 3 2 g Cases 1 and 2 still showed normal* takes of radioactive iodine one and three years er respectively All the patients have subsequently mained well and free from symptoms.

Thus thyroid function in these cases of subacute yroiditis resembles that found in a normal person king an antithyroid drug such as thiouracil; the pacity to form new thyroid hormone is blocked, but there is an unimpaired release of hormone from the gland's large store of previously formed hormone Further *after a short course of thiouracil* the apparently similar antithyroid agent has evidently been dispelled from the affected gland.

THYROID BIOPSY

From case 3 a biopsy specimen was taken by Mr Selwyn Taylor twelve days after the patient had finished her first course of three days' thiouracil and when clinically she had partially remitted

Dr I Doniach reported 'Section of the thyroid gland (fig 2), fixed in alcohol, shows separation of acini by a stroma increased in bulk by fibrous tissue infiltrated with a moderate number of plasma cells and histiocytes and with a *fair number of lymphocytes, scattered* and arranged in clumps The acini, which are small and medium-sized, vary in appearance Many are filled with strongly eosinophilic colloid and are lined by flattened cells. Others contain little or no colloid and are lined by high cuboidal cells In a number of acini the lining cells are intact but the colloid has retracted and is infiltrated with nuclei to form pseudo giant cells (fig 3) *A few acini are present whose walls* have broken down (fig 4); one of them contains three pseudo giant cells The capsule at the edge of the section is seen to be continuous with the fibrous tissue of a local muscle sheath The presence of acini undergoing acute degenerative changes of focal interstitial infiltration with inflammatory cells, of pseudo-giant cells, and of adhesions to muscle all favour a diagnosis of subacute thyroiditis "

BLE I—MEASUREMENTS OF THYROID FUNCTION (BEFORE AND AFTER THIOURACIL) IN THREE CASES OF SUBACUTE THYROIDITIS

and age (yr)	Before thiouracil								After thiouracil						
	Thyroid gland		B.M.R.	Plasma-cholesterol (mg per 100 ml.)	Plasma protein bound iodine (mg per 100 ml.)	Urinary I^{131} excretion †			Thyroid gland		Plasma-cholesterol (mg per 100 ml.)	Plasma protein bound iodine (mg per 100 ml.)	Urinary I^{131} excretion †		
	Size	On palpation				% 0–48 hr (day)	K_t	K_e	Size	Tenderness			% 0–48 hr (day)	K_t	K_e
5	Twice the normal; each lobe = 5·6 × 2 5 cm.	Tense sl. tender no nodules some cerv lymph-glands (41d)	+1% (41d)	230		91 3 (43d)	1 3%	11 9%	(a) (17d) — only 1 lobe large (4 × 1 cm) (b) (44d) — normal	Gone in few days					
14	Twice the normal; rt lobe 6·5 × 2·5 cm. Isth 3 × 2·5 cm. lt lobe normal	Tender tense no nodules, no cerv lymph glands (38d)	+0% (41d)	187 (30d)	5·2 (30d)	95 3 (37d) 96 7 (33d)	0·5% 0·0%	10 7% 14 7%	(a) (15d) — small and soft (b) (38d) — normal	Only slight by second day	197 (54d)	3·5 (54d)	89 5 (14d) 41 8 (60d) 50 3 (300d)	1·4% 14 7% 8·2%	10·4% 11 2% 8·0%
3 76	Twice the normal, rt lobe 5 5 × 4 3 cm. lt lobe 5·5 × 4 3 cm. Isth 1 5 cm.	Tender tense (35d)	+16% (35d)	150 (25d) 209 (51d)	4 8 (30d)	93 6 (30d) (under 1% found in thyroid gland by local measurement)	0·0%	5·0%	(a) (2d) — smaller and softer and less tender (b) (4d.) — rt lobe 4 5 × 3·5 cm.; lt lobe 4·5 × 3 cm.; (c) (26d) — normal	Non tender	209 (14d) 240 (23d)		63 3 (11d) 29 7 (25d) 34·0 (50d)	1 7% 6·0% 17·0%	3·6% 2·6% 5·8%

ote —(1) Before treatment tense tender enlarged thyroid without any capacity for iodine uptake (K_t I^{131} under 2%) but evidence of normal thyroid secretion (B.M.R., cholesterol and P.B.I.)

(2) Post-treatment restoration of normality in all three (tenderness lost at 3 days, iodine uptake normal at least by 25d full normality 2–4 weeks)

* In parentheses with each observation is its day (e.g. 11d) which, for those before thiouracil = the day after onset of the illness and for those after thiouracil = day after starting thiouracil

† Urinary I^{131} excretion: the first figure is the percentage of administered carrier free dose excreted in 48 hours, and the next two are constants calculated from the urinary excretion curve; K_t = an index of thyroid uptake—i.e., the percentage of circulating I^{131} removed hourly from the blood to non-renal sites nearly all to the thyroid (normal values = mean 7 83% ± s d 0 18%, range 3·8–11·8%)—K_e = a similar index of urinary extraction rate—i.e. the percentage of circulating I^{131} removed hourly to the urine (normal values = mean 8 56% ± s.d. 0·20% range 4·9–12·0%).

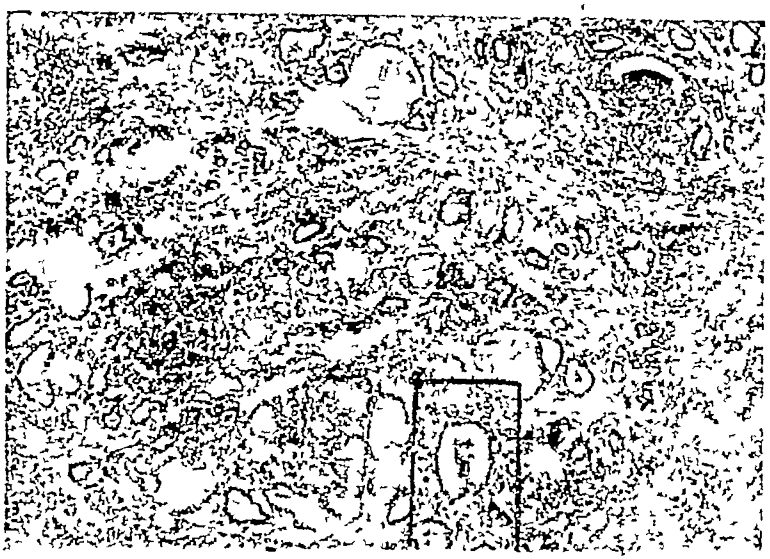

Fig. 2—Biopsy specimen from case 3 on 12th day after 3-day course of methyl thiouracil, when disease had partly remitted. Black line indicates part shown at higher magnification in fig. 3. (Hæmatoxylin and eosin.) (×45.)

THIOURACIL TREATMENT

The details of the treatment given and of the clinical response are shown in table II. Adequate doses of penicillin and sulphonamides did not affect the syndrome. The striking feature is the speed of the remission after the start of thiouracil treatment; thyroid pain and tenderness was almost gone by the second day, and both the thyroid and the general condition of the patient, the malaise, the fever, and the raised E.S.R. were restored to normal in about two to four weeks. Full restoration to normal may have been earlier in the intervals between the outpatient visits. An attempt was made in case 3 to assess the minimum duration of thiouracil treatment required; her first course of three days did not suffice. A total of nine days for case 3 and of twelve days for case 2 were followed by a rapid and complete remission.

DISCUSSION

The clinical picture and findings in our 3 patients are typical and pathognomonic of subacute thyroiditis. The disease evidently affects predominantly, but not exclusively, women (Crile and Rumsey 1950) and almost always adults; case 3, aged 76, is the oldest patient yet recorded. As in our cases, there is often no history or other evidence to suggest previous thyroid disease or goitre. Subacute thyroiditis has been observed in association with a large variety of infections, mostly upper respiratory infections (Clute and Smith 1927) but including measles (Candel 1946), scarlet fever (Jensen 1943), neck infections (Higbee 1943), and malaria (Sein 1938). A history of such an association cannot always be elicited, as with our case 3. A virus cause has been suggested, but studies have not yet been successful. Crile and Rumsey (1950) have described the diagnostic criteria based on 38 cases, mostly proved by biopsy.

Subacute thyroiditis may present either as an acute fever with acute local and referred thyroid pain, or as a chronic, slightly painful, and tender thyroid swelling with little, if any, fever or malaise. A history of a painful onset can usually be elicited, often only after questioning, and the pain is often referred to the ear. The diagnostic syndrome is a firm tender thyroid associated with general malaise and especially fatigue and shown usually by fever and always by a raised E.S.R. The condition may affect a localised area of the thyroid and simulate an adenoma or cyst with sepsis or hæmorrhage; it may also be migratory from one part of the thyroid to another, as in case 2.

Clinical signs and measurements of thyroid secretory activity are usually normal, but occasionally there are signs of slight hypersecretion. The B.M.R. and plasma cholesterol levels are usually normal (Crile and Rumsey 1950). Measurements of plasma protein bound iodine (P.B.I.) made by Keating et al. (1947), McConahey and Keating (1951), Hamilton et al. (1950), and Robbins et al. (1951) agree with our finding of normal values in 2 cases, which clinches the evidence of continuing normal supply of thyroid hormone to the tissues. This disease usually starts in a previously normal thyroid, in which there is about two months' store of preformed hormone. However, occasional cases, like our case 1, may show signs of slight excess of circulating hormone. Indeed,

TABLE II—THIOURACIL TREATMENT OF THREE CASES OF SUBACUTE THYROIDITIS

Case no., sex, and age (yr.)	Preliminary antibiotics (heavy doses) all without response	Methyl thiouracil			Associated drugs	Clinical response			
						Days from first thiouracil dose when			
		Started (days after onset of disease)	Daily* dosage (g.) t.d.s.	Total duration and dose given (days)		Neck pain almost gone	Thyroid normal	Malaise gone	E.S.R. (Westergren) found normal (and original value)
1 F35	21 days sulphadimidine (25 g.) 7 days penicillin (7.0 megall)	46 (this patient already beginning to improve)	0.2	44 (26.4 g.)	Thyroid gr. 3 daily for 44 days	Few days	14	14	Between 0 and 43d (=5 mm./hr) (originally =40 mm./hr.)
2 F34	8 days' penicillin (9.6 megall)	38	0.2	10+2† (7.2 g.)		2nd	Between 14 and 38	26‡ or less	Between 11 and 43d (=9 mm./hr.) (originally =37 mm./hr.)
3 F76	7 days' sulphadimidine (18 g.) 10 days penicillin (6.0 megall)	37	0.2	3+6† (3.3 g.)		2nd	23	18	Between 22 and 63d (=6 mm./hr.) (originally = 83 mm./hr.)

* Except in case 3 second course of 6 days, when 0.15 mg. daily was given.

† Gaps in case 2 (6 days between 10th and 11th thiouracil day). Gaps in case 3 (11 days between 4th and 5th thiouracil day and of 2 days between 6th and 7th thiouracil day).

‡ This patient had her thiouracil intermitted at the 10th day because of thiouracil fever (102°F) without leucopenia, which recurred on the second day of resumed treatment 6 days later. Some of the subsequent malaise may have been due to this.

the usual histological picture shows damaged thyroid epithelium and islands of free colloid from which excessive absorption might take place; but these are usually surrounded by giant cells, which may delay its absorption. There are also normal mechanisms, probably mainly hepatic, capable of rapidly removing moderate excesses of hormone from the circulation. But hormonal release must usually be normal because, though no new hormone can be made the thyroid's stores continue to supply hormone for one or two months; we found normal levels of *circulating* P.B.I. *in two cases more than a month* after the onset of the disease. The slightly increased hormonal release shown in occasional cases may be a simple consequence of some exposure of the 'naked' vesicular colloid due either to an unusual degree of damage to thyroid cells or to less adequate walling-off of such colloid islands by giant cells. The striking abnormality of thyroid function is the complete suppression of the thyroid's uptake of iodine as shown by radio iodine tests (Crile and Rumsey 1950 Keating et al 1950 McConahey and Keating 1951 Werner et al 1949 Hamilton et al 1950), which are therefore of diagnostic value. This selective impairment of iodine uptake with in most cases preservation of normal hormonal release, suggests a specific poisoning, pharmacologically similar to that by thiouracil. Robbins et al. (1951) have shown that injections of thyrotrophic hormone will restore the iodine uptake in such cases towards the normal this caused a *temporary improvement* in the clinical picture in 5 of 9 cases.

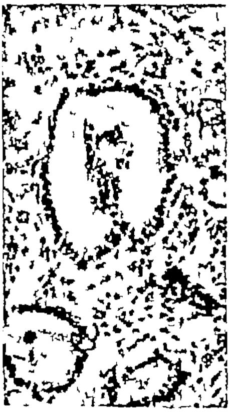

Fig 3—Part of fig. 2 showing pseudo-giant cell. (×195.)

There is but scanty information about the outcome of the untreated disease, Schilling (1945) gives the usual duration as one to twelve months and the final outcome as complete remission. The speed of the remissions, reported by Crile and Rumsey (1950) with radiotherapy for 25 patients, and by King and Rosellini (1945) with thiouracil for 8 of 11 patients, also seen in our 3 patients makes them unlike spontaneous remissions. Indeed there is a striking similarity in this speed either after deep X ray therapy or after thiouracil. Crile and Rumsey (1950) report that after X rays there is often complete relief on the second day loss of all symptoms by two weeks, and restoration to normal within a month—a sequence closely followed by our patients after thiouracil (table I). The biopsy specimen taken from case 3 possibly offers further evidence of the speed of the remission. On the twelfth day after three days of thiouracil when clinical remission was *incomplete* the thyroid epithelium was mostly healthy looking and only two giant cells were seen—both unusual findings for this disease (Crile and Rumsey 1950). There is insufficient information to define the optimal course of thiouracil treatment. But *since after two weeks clinical remission* is well instituted and 2 of our cases remitted after only nine and twelve days of thiouracil but 1 only incompletely after three days, a reasonable preliminary suggestion seems to be ten days which duration should also be almost *free from risk of serious toxic effects from* the thiouracil. We have used our conventional initial dosage for thyrotoxicosis (i.e., 0.2 g. of methyl thiouracil t.d.s.) less may be ineffective.

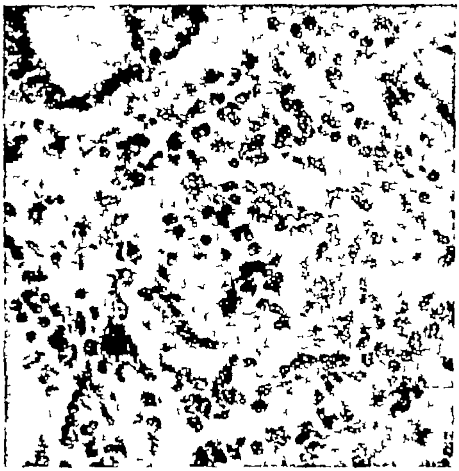

Fig. 4—Same biopsy specimen as in fig. 2, showing acinus with broken down walls and containing pseudo-giant cells. (×380.)

Since the cause of the disease has not been found, the mode of action of thiouracil in this disease must also remain hypothetical. Obviously it must differ from that involved in its control of thyrotoxicosis for in subacute thyroiditis the gland has already lost its capacity to concentrate and bind iodine, the excess of which function thiouracil controls in hyperthyroidism. The functional status of the gland with subacute thyroiditis suggests an inflammation which inactivates the enzyme systems which can be inhibited by thiouracil but not those involved in the controlled release of thyroid hormone. In view of the sharp onset of the disease, the systemic and local evidence suggesting toxæmia or infection, and the ultimate complete remission a virus infection of the thyroid seems the most reasonable hypothesis. A bacterial infection is unlikely in view of the negative bacteriological findings (Womack 1944) and the condition's unresponsiveness to the usual antibiotics and there seems to be no likely source for a toxæmia of extrathyroid origin. Both irradiation of the thyroid and thiouracil which is concentrated there, may be viricidal. Possibly the thiouracil may compete for a binding position in the thyroid cell to which the virus had already become attached. We are at present investigating some of these possibilities.

SUMMARY

In three cases of typical subacute thyroiditis both the systemic toxæmia and thyroid function were measured before and after a rapid remission which followed a *short course of methyl thiouracil*.

Initially the three cases showed fever a raised E.S.R., and a tender tense diffusely enlarged, and painful thyroid gland.

Two cases showed no signs of disturbed thyroid *secretory function* *the other* showed some clinical signs suggesting slightly increased release of thyroid hormone. All measured criteria of thyroid secretion, B.M.R. (three cases) plasma cholesterol (three cases) and plasma protein bound iodine (two cases) were *normal*.

The uptake of radio iodine by the thyroid was absent or insignificant in all three cases, and returned to normal after remission of the disease

After treatment with methyl thiouracil 0 6 g daily for forty-four, twelve, and nine days, considerable remission was evident in two days and it was probably complete at two to four weeks

Further trial is recommended of methyl thiouracil 0 2 g t d s for ten days, which may be continued longer if remission then seems insufficient

These findings suggest that subacute thyroiditis comprises a thyroid inflammation involving specific interference with the thyroid's capacity for hormonal synthesis but not with its release of hormone, and that thiouracil rapidly disperses the causal agent, which may be a virus

We wish to thank Mr Selwyn Taylor for the surgical biopsy, Dr I Doniach for the report thereon, and Mr D G Arnott and Miss R Berger for the measurements of radioactivity

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MUMPS MENINGO-ENCEPHALITIS

AN OUTBREAK IN A PREPARATORY SCHOOL

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INVOLVEMENT of the central nervous system in mumps has been recorded with increasing frequency during the past forty years, and several writers have suggested that it should be regarded as a normal manifestation of the disease rather than a complication (Levison and Thordarson 1942, Bang and Bang 1943, van Rooyen and Rhodes 1948)

The neurological condition most often met with in mumps is meningo encephalitis, other much less common ones are myelitis, peripheral neuritis, and labyrinthitis The incidence of meningo encephalitis has varied widely in different epidemics Bang and Bang (1943) reported signs of involvement of the central nervous system in about two-thirds of 372 patients, Brown et al (1948) in 34% of 77 patients (mostly young American soldiers), and Holden et al (1946) in 33% of 100 consecutive mumps cases in hospital On the other hand, Levison and Thordarson (1942) found only 106 instances among 7820 mumps patients (1 35%), and Brooks (1918) none at all among 1059

Comparison of these reports and numerous others is not easy, because different criteria are used to assess involvement of the central nervous system In some series this has been assessed on purely clinical grounds, whereas in others routine lumbar punctures have been performed After the observation of Finkelstein (193 that often cerebral involvement could be detected on by spinal tap, other workers have examined lar numbers of specimens of cerebrospinal fluid (C.S F) (26 cases with positive C S F findings reported by Brow et al (1948) only 9 showed clinical signs of mening encephalitis, and of the 235 positive fluids examined b Bang and Bang (1943) 106 were from cases of "manifest meningitis, while the other 129 were said to have "latent meningitis Candel et al (1944) noted that, althoug only 10 of their series of 38 patients with mumps ha clinical meningitis, 30 showed an increased numbe of cells in the C S F

In most cases the signs of involvement of the centr nervous system have followed shortly after the develo ment of parotitis, sometimes they have been noted ju before the parotitis appeared, and occasionally the have been associated with orchitis attributed to mump Increasing interest is being shown in those cases o meningo encephalitis which occur without either parotiti or orchitis but are thought to be due to mumps viru either because of the clinical or epidemiological associa tion, as in the cases described by Bang and Bang (1943 or because of confirmatory culture of the virus or sero logical reactions (Kilham 1949) Eberlein and Lynxwile (1947), surveying the literature, found that of 280 case of mumps meningo-encephalitis 36 had occurred withou parotitis or orchitis

The present series is noteworthy because of th explosive nature of the epidemic in a comparativel closed community, and because of the high proportion o cases in which the central nervous system was affected

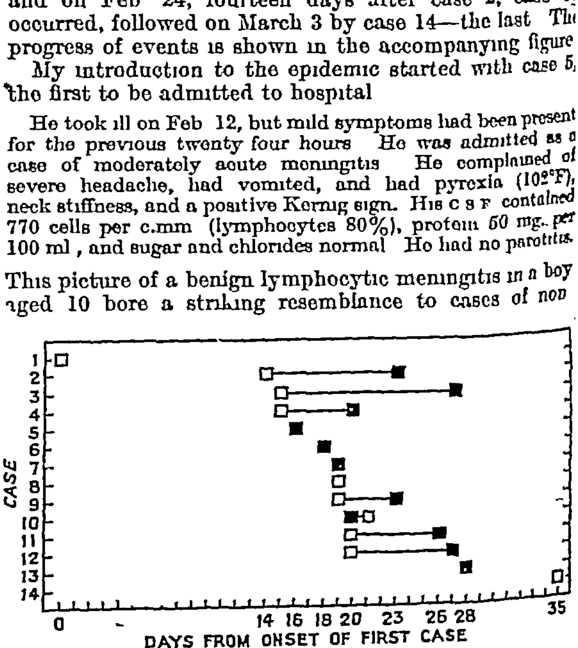
THE OUTBREAK

The scene of the outbreak was a boys' residentia preparatory school in a somewhat isolated countr house School had reopened on Jan 19, 1951 Case 1 occurred on Jan 27, the boy developed bilatera parotitis, was isolated overnight, and was sent home next day Case 2 occurred on Feb 10, fourteen day after case 1 In the next six days there were 10 further cases of mumps and/or meningitis (8 boys and 2 member of the staff) From Feb 16 to Feb 24 there was a lull and on Feb 24, fourteen days after case 2, case 1 occurred, followed on March 3 by case 14—the last The progress of events is shown in the accompanying figure

My introduction to the epidemic started with case 5, the first to be admitted to hospital

He took ill on Feb 12, but mild symptoms had been present for the previous twenty four hours He was admitted as a case of moderately acute meningitis He complained of severe headache, had vomited, and had pyrexia (102°F), neck stiffness, and a positive Kernig sign. His C S F contained 770 cells per c.mm (lymphocytes 80%), protein 60 mg. per 100 ml, and sugar and chlorides normal He had no parotitis.

This picture of a benign lymphocytic meningitis in a boy aged 10 bore a striking resemblance to cases of non



Chronology and types of cases in outbreak of mumps: open squares, parotitis; black squares, meningitis.

TABLE I—DETAILS OF CASES OF MENINGITIS

Case no	Parotitis	Age (yr)	Clinical observations								Cerebrospinal fluid				
			Interval before meningitis (days)	Headache	Vomiting	Nausea	Neck rigidity	Kernig's sign	Highest temperature (°F)	Duration of fever (days)	Total no of cells (per c.mm)	Lymphocytes %	Total protein (mg per 100 ml.)	Chlorides (mg per 100 ml.)	Sugar (mg per 100 ml.)
2	Associated with parotitis	11	0	++	+	+	S	+	99	2	99	84	30		
3		11	12	+	–	+	+	+	98	–	2	100	10		66
4		13	5	S	–	–	+	+	101	3	21	95	20		*
9		20	4	++	–	+	+	S	103	1	132	80	50		*
10		9	–1	++	–	–	+	+	102	5	177	92	30		*
11		10	6	S	–	–	S	S	102	1	148	83	30	687	62
12		12	7	–	–	+	S	+	99	1	2	100	20		69
5	No parotitis	10	–	++	+	+	+	+	103	7	770	80	50	720	60
6		11	–	+	+	+	+	+	103 5	3	91	80	40	740	N
7		7	–	S	+	+	+	+	102	3	*	*			
13		8	–	+	+	–	+	S	102	2	284	83	30	713	55

N normal. S slight +, present. – absent. * not tested.

paralytic poliomyelitis seen locally in the late summer of 1950

Two days later case 6 was admitted to the same ward with a very similar picture of benign lymphocytic meningitis and without parotitis. It then transpired that there had been 4 cases of mumps (parotitis) at the school, and that 3 were still in isolation there The common ætiology of the two conditions was suspected but could not then be proved Cases 7 8 and 9 occurred next day (Feb 15) case 7 being the third case of meningitis without parotitis, and cases 8 and 9 being parotitis in the staff More conclusive proof of the ætiology of the meningitis was provided on Feb 16 when case 4 almost recovered from parotitis, developed meningitis—confirmed by lumbar puncture in hospital During the following week symptoms of meningitis developed in 5 of the earlier parotitis patients, and all were admitted to hospital for diagnostic lumbar puncture and observation

The final picture was as follows There were 9 cases of primary parotitis; 6 of these developed a definite meningeal reaction 2 showed no evidence of involvement of the central nervous system at any stage and 1 (case 1) was treated at home by his own doctor and was never seen by me. (It was later reported that in the second week of his convalescence he had a slight headache and spent two days in bed: possibly this was the same meningeal syndrome.) In 1 case the illness presented as meningitis but parotitis developed next day 4 cases presented as meningitis and at no stage showed any parotitis or orchitis all were in hospital and closely watched. Hence of 14 patients, 11 showed definite evidence of involvement of the central nervous system and a 12th may have had a similar condition

The number of boys at school at the time was 39 of whom 15 had previously had mumps The outbreak affected 12 of the 24 boys at risk.

CLINICAL FINDINGS

Cases Without Meningitis

Case 1 aged 11 may have had a mild meningeal reaction during his convalescence case 8 a female member of the staff aged more than 30 had a very mild parotitis of short duration and case 14 aged 11 had a simple parotitis at the end of the outbreak. None of these 3 patients was admitted to hospital

Cases With Meningitis

The observations are summarised in table I Apart from 1 young male member of the staff the patients were boys aged 7–13 years. The parotid glands were the only salivary glands involved The amount of swelling varied and in most cases it subsided quickly Orchitis was not found in any case The highest recorded temperature was 103 5°F and the longest duration of pyrexia seven days. Most cases had only a mild fever of short duration. One boy had a normal temperature throughout.

A lumbar puncture was performed on all cases showing meningeal signs as soon as the signs had become definite and the patient had been admitted to hospital In all but 1 case this was within twenty four hours: in case 13 forty eight hours elapsed before admission to hospital. Reports on the C.S.F are available for 10 of the 11 cases investigated in the 11th (case 7) the entire specimen of C.S.F was inadvertently sent to the virus laboratory In all but 2 cases (nos 3 and 12) a lymphocytic pleocytosis was found, the cell-counts ranged from 21 to 770 per c.mm and protein never more than 50 mg per 100 ml. In no case was a second lumbar puncture done.

Clinical progress was uneventful in nearly all the cases. The meningeal symptoms had mostly disappeared by the third or fourth day Even the most ill boy was making satisfactory progress in his second week. Final recovery was always complete

DISCUSSION

Involvement of the central nervous system in these cases was indicated by signs of meningeal irritation unaccompanied by cranial nerve lesions, and left no permanent sequelæ No case showed lethargy drowsiness or delirium The clinical picture was predominantly that of meningitis in some cases the signs were well marked and in others they were just detectable Always, however the onset of symptoms was sudden

The C.S.F changes were mostly characteristic, with a lymphocytic pleocytosis little or no increase in protein and a normal amount of chloride and sugar Cases 3 and 12 showed no pleocytosis in the C.S.F though clinical signs of meningitis were undoubtedly present. Other workers, notably Lindo (1930) Tabor and Newman (1940) and Halcrow and Wang (1945) have also recorded occasional cases in which lymphocytic pleocytosis was insignificant or absent. Lindo (1930) has suggested that the C.S.F changes may appear later

In 4 of these cases no parotitis or orchitis was detected and the clinical picture was that of acute benign lymphocytic meningitis The very close resemblance of the illness to non paralytic poliomyelitis was striking The same diagnostic difficulty was pointed out by Kilham et al (1949) In isolated cases of the same sort a history of contact with either mumps or anterior poliomyelitis would help to decide the ætiology Ahlberg (1942) has suggested that a considerable proportion of cases of benign lymphocytic meningitis may be due to mumps and points out that parotitis is commonest from November to May whereas poliomyelitis occurs mostly in late summer and autumn Macrae and Campbell (1949) however collected their 14 cases of mumps meningoencephalitis between May and September 1948, and noted

TABLE III—DISTRIBUTION OF RESULTS IN A SERIES OF TESTS USING SHEEP CELLS AT THREE DIFFERENT LEVELS OF SENSITISATION WITH HORSE ANTIBODY

Degree of sensitisation (M.A.D.)	Rheumatoid group		Control group	
	Positive	Negative	Positive	Negative
0·25	15 (60%)	10 (40%)	1 (4%)	24 (96%)
0·5	22 (88%)	3 (12%)	2 (8%)	23 (92%)
1·0	24 (96%)	1 (4%)	9 (36%)	16 (64%)

Source of Antibody

All titrations were repeated with a sheep red-cell suspension sensitised with 0·5 M.A.D. of rabbit antibody. Over a large series the serum titres and the distribution of positives showed no significant difference from results obtained with sheep cells sensitised with horse antibody. This shows that our findings were comparable with those of Rose et al. (1948) and other workers who used cells sensitised with rabbit antibody.

Source of Red Cells

When sera were tested against guineapig, mouse, or sheep cells sensitised with 0·5 M.A.D. of the corresponding rabbit antibody all the findings described above were reproducible, and over a series of examinations the titres and distribution of positives were closely comparable with each other.

The mouse red-cell rabbit antibody system was particularly satisfactory. Agglutination was rapid, and cell clumps were large, easily visible, and very stable to continued shaking, but with no increased tendency to spontaneous agglutination.

Neither unsensitised mouse nor guineapig cells were agglutinated by sera from which heterophil antibody had been absorbed.

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All the procedures were repeated on many sera with suspensions of each type of red cell sensitised with 0·25, 0·5, or 0·75 M.A.D. of rabbit antibody and finally a suspension of fully sensitised cells—i.e., 1·0 M.A.D. Table II shows that the agglutination titre is proportional to the degree of sensitisation of each type of cell, but the ratio between normal and rheumatoid sera is unaffected.

Increase in sensitivity of the reaction can be achieved only at the expense of specificity, and vice versa, as is shown by *table III*.

When fully sensitised cells were used, very low agglutination titres were noticed for the first time in *sera treated with* ammonia or with hydrazine. The titre, however, was the same whatever the titre of the original serum, and the degree of agglutination was little greater than that in the saline control. This phenomenon was probably a manifestation of the extreme instability of fully sensitised red-cell suspensions and was entirely non-specific. The most reliable results are likely to be obtained with suspensions sensitised with 0·5 M.A.D. of antibody.

DISCUSSION

Mechanism of Reaction

The activity of the rheumatoid arthritis agglutinating factor on several combinations of red cells and specific antibody, but not on unsensitised cells, suggests a complement-like activity.

The experiments described above show that C′1, C′2, and C′3 can be excluded, but that *the agglutinating factor and C′4 have many characteristics in common.*

Thus the well-marked agglutinating activity in *rheumatoid arthritis* seems to be due to an augmentation of a normal serum-agglutinating factor described by Gorrill and Hobson (1952). We pointed out that the evidence for that factor and C′4 being the same substance was very strong, but could *only* be circumstantial, since we were dealing with a complex mixture of serum proteins and not with chemically pure *substances* which could be readily isolated.

The present work confirms many of our earlier findings, and the correlation of raised agglutinating titres with increased lytic titres of C′4 in rheumatoid arthritis supports our suggestion that C′4 has an agglutinating action. Nevertheless this must remain largely a matter *of inference in the present state of knowledge of the* chemistry of complement.

Clinical Value of Test

The specificity and sensitivity of the test in our hands were comparable with the results obtained by Waaler (1940), Rose et al. (1948), and Heller et al. (1949). We found the test positive in a higher proportion of cases than did Jawetz and Hook (1949) or Ball (1950), and *the difference in titre between rheumatoid arthritis* and normal sera was greater than that found by Miller et al. (1949).

The differences in sensitivity reported by various workers may be largely due to differences in diagnostic criteria and in selection of cases in the disease group. The rheumatoid arthritis group in the present series contained mainly clinically obvious active cases, most of them in hospital inpatients, and thus represent the more severe forms of the disease. This fact may explain the well-marked sensitivity of the test in this series. In a larger group including all *stages* of rheumatoid arthritis, the test would possibly be less sensitive than the present series suggests.

The non-rheumatoid group of cases does not represent an extensive survey of disease, but was designed to include conditions similar to rheumatoid arthritis and normal controls.

Within these limits the reaction was specific enough to distinguish moderately active rheumatoid arthritis from other forms of polyarthritis of equal severity. Other collagen diseases tend to give a positive reaction but apparently only if *there are manifestations* of peripheral arthritis. Allergic conditions, such as asthma, do not give titres above normal values. In 8 of the cases of rheumatoid arthritis investigated so far we have repeated the test at short intervals during cortisone therapy; from these few observations it seems that the agglutinating titre does not fall significantly despite the rapid and well-marked improvement in clinical condition during treatment. Further investigations on this *aspect must obviously* be made, but at present it does not appear likely that the test will prove of value in assessing the short-term effects *of therapy*.

SUMMARY

Sera from cases of rheumatoid arthritis contain increased amounts of a heat-stable *factor*, present in normal serum, which potentiates agglutination of partly sensitised red cells.

This factor is very closely associated in its behaviour and properties with the heat-stable fourth component (C′4) of complement. Inferential evidence of this association is presented.

The lytic titre of C′4 in rheumatoid arthritis tends to be raised above normal levels in cases showing raised agglutinating titres.

The reaction is highly specific for rheumatoid arthritis and is positive in most cases of moderate severity.

Agglutination titres do not reflect the rapid change in clinical activity produced by cortisone.

Increase in the sensitivity of the test is only likely to be achieved at the expense of its specificity.

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(2) One volume of sensitised sheep red cell suspension plus three volumes of saline solution to ensure that the cells did not undergo spontaneous agglutination

(3) A known negative serum titrated with each batch of tests.

RESULTS

Sheep red cells sensitised with 0 5 M A D of horse antibody were adopted as the standard, and results of titrations with this system will be described first

A titre of 1/30 was taken as an arbitrary normal level in the light of experience (Gorrill and Hobson 1952) If titres above this level are regarded as positive for the purposes of this investigation, the distribution of results is as shown in table I

TABLE I—DISTRIBUTION OF RESULTS OBTAINED WITH SHEEP RED CELLS SENSITISED WITH 0 5 M A D OF HORSE ANTIBODY

(A titre of 1/30 or less is taken as the arbitrary normal level)

Source of serum	No of cases	No positive	No negative	Per centage positive
Rheumatoid arthritis	67	57	10	85
Normal controls and non rheumatoid conditions	68	9	59	13

Rheumatoid Arthritis

85% of the 67 cases were positive, and there was some correlation between the titre and the clinical state of activity of the disease

Severe form (12 cases) all were positive Average titre = 1/100
Moderate form (40 cases) all were positive Average titre = 1/80
Mild or early form (8 cases) 5 were positive Average titre = 1/50
Inactive form (7 cases) all were negative, with titre less than 1/30

Only 5 cases of rheumatoid arthritis had a history of less than six months' duration Two cases were positive, both with a titre of 1/40, and 3 were negative

Non rheumatoid Group

Sera were obtained from normal persons, forms of polyarthritis other than rheumatoid (e g , osteo-arthritis, psoriatic arthritis, Reiter's syndrome, infective arthritis, and rheumatic fever), collagen diseases (polyarteritis nodosa, diffuse lupus erythematosus, and scleroderma), and various allergic conditions including asthma, hay-fever, and urticaria

Only 9 positive sera were found in this group, and their source and titres were as follows

Diffuse lupus erythematosus with arthritis (2 cases)	Titres = 1/60, 1/80
Polyarteritis nodosa with arthritis (2 cases)	Titres = 1/90, 1/70
Ankylosing spondylitis with peripheral arthritis (2 cases)	Titres = 1/70, 1/80
Normal controls (3 cases)	Titres = 1/40

Having confirmed the augementation of serum-agglutinating activity in rheumatoid arthritis, we investigated the identity and properties of the agglutinating factor as follows

Heat stability

Further heating of the serum for one hour fails to reduce the agglutinating titre We have observed that agglutination titres in normal sera may actually rise slightly after continued heating, and we suggest that this further heating destroys the combining property of C'1, which opposes the action of the agglutinating factor (Gorrill and Hobson 1952) This blocking action of C'1 is discussed below. The same effect was noticed in the present work with high titre sera from cases of rheumatoid arthritis

Absorption of C'3 by Zymosan

Complete removal of C'3 from each of the 135 sera represented in table I had no effect on the agglutinating titres

Inactivation of C'4 by Ammonia

The agglutinating activity was destroyed, together with loss of C'4 lytic activity, by the treatment described above This was demonstrated in all the 135 cases tested, whatever the source of original titre of the serum

Inactivation of C'4 by Hydrazine

This treatment gave results identical with those described above in rheumatoid and normal sera

Fractionation of Complement

The redissolved precipitate (C'1 and C'3) was devoid of agglutinating properties The supernatant fluid (C'2, C'4, and a little C'3) contained the full agglutinating activity of the whole serum in both normal and arthritic cases

Inactivation of C'2 by heating at 56°C, and removal of the small amount of C'3 from the supernatant fluid by zymosan, did not affect the titre, but treatment of the supernatant fluid with ammonia or with hydrazine removed the agglutinating activity entirely

Antagonistic Action of C'1

Sensitised cells were allowed to fix C'1 in excess by incubating them together at 37°C for one hour After being washed and resuspended the C'1 coated sensitised cells were used to titrate known positive sera Titres were lower than with uncoated sensitised cells Sensit xposed to C'1 previously heated at 56°C for min titre as untreated sensitised c

Gorrill and Hobson (1952) taken place rather earlier activity of normal sera was Pillemer et al (1942) describ all Nevertheless the figures lytic reaction by C'1 in simila cases of meningitis without that C'1 competes with C'4 for co s Examinations of the red cell. This combining property horiomeningitis virus heating at 56°C for twenty minutes negative but is destroyed by further heating causes of a become

Lytic Titration of C'4

All four complement components are needed for The titre of the component present in lowest concentration determines the titre of the whole complement (Hegedus and Greiner 1938) If ammonia treated complement—i.e., C'1, C'2, and C'3—is added in known excess to arithmetical dilutions of the serum under test, the C'4 content of the latter becomes the limiting factor The lytic titre of the mixture is then a measure of the C'4 concentration (Bier et al. 1945)

We applied this principle in a constant-volume technique and found that normal sera gave a C'4 lytic titre of 1/50–1/75 after fifteen minutes' incubation at 37°C Sera from several cases of rheumatoid arthritis with raised agglutinating titres gave increased lytic titres, with an average titre of 1/200

Lytic titres in non arthritic conditions, and in the cases of rheumatoid arthritis with normal agglutinating titres, were not above normal limits A rise in C'4 lytic titres is thus associated with the augmented agglutinating activity in rheumatoid arthritis

RÔLE OF CONSTITUENTS OF TEST

The influence of the species of origin of the red cell and antibody and the degree of sensitisation were next investigated Each factor was varied in turn, and the result of titration compared with that using the standard system of sheep red cell and horse antibody

TABLE II—RESULTS OBTAINED BY TITRATING A NORMAL AND A KNOWN POSITIVE SERUM WITH EACH TYPE OF RED CELL SENSITISED WITH VARIOUS DOSES OF RABBIT ANTIBODY

Cell	Anti body	Sensitising dose of antibody (M.A D)	Titre of serum heated at 56°C for 20 min		Titre after ammonia treat-ment		Cell saline control
			Positive case	Negative control	Positive case	Negative control	
Sheep	Rabbit	0 25 0 5 0 75 1 0	50 70 90 150	10 30 50 90	±10	±10	Faint agglutination
Guineapig	Rabbit	0 25 0 5 0 75 1 0	50 70 80 150	10 30 40 90	±10	±10	Agglutination
Mouse	Rabbit	0 25 0 5 0 75 1 0	50 70 90 150	10 30 50 100	10	±10	Agglutination

TABLE III—DISTRIBUTION OF RESULTS IN A SERIES OF TESTS USING SHEEP CELLS AT THREE DIFFERENT LEVELS OF SENSITISATION WITH HORSE ANTIBODY

Degree of sensitisation (M.A.D.)	Rheumatoid group		Control group	
	Positive	Negative	Positive	Negative
0·25	15 (60%)	10 (40%)	1 (4 „)	24 (96%)
0·5	22 (88%)	3 (12 „)	2 (8%)	23 (92%)
1·0	24 (96%)	1 (4%)	9 (36%)	16 (64%)

Source of Antibody

All titrations were repeated with a sheep red-cell suspension sensitised with 0·5 M.A.D. of rabbit antibody. Over a large series the serum titres and the distribution of positives showed no significant difference from results obtained with sheep cells sensitised with horse antibody. This shows that our findings were comparable with those of Rose et al. (1948) and other workers who used cells sensitised with rabbit antibody.

Source of Red Cells

When sera were tested against guineapig, mouse, or sheep cells sensitised with 0·5 M.A.D. of the corresponding rabbit antibody, all the findings described above were reproducible, and over a series of examinations the titres and distribution of positives were closely comparable with each other.

The mouse red-cell rabbit antibody system was particularly satisfactory. Agglutination was rapid, and cell clumps were large, easily visible, and very stable to continued shaking, but with no increased tendency to spontaneous agglutination.

Neither unsensitised mouse nor guineapig cells were agglutinated by sera from which heterophil antibody had been absorbed.

Degree of Sensitisation

All the procedures were repeated on many sera with suspensions of each type of red cell sensitised with 0·25, 0·5, or 0·75 M.A.D. of rabbit antibody, and finally a suspension of fully sensitised cells—i.e., 1·0 M.A.D. Table II shows that the agglutination titre is proportional to the degree of sensitisation of each type of cell, but the ratio between normal and rheumatoid sera is unaffected.

Increase in sensitivity of the reaction can be achieved only at the expense of specificity, and vice versa, as is shown by table III.

When fully sensitised cells were used, very low agglutination titres were noticed for the first time in sera treated with ammonia or with hydrazine. The titre, however, was the same whatever the titre of the original serum, and the degree of agglutination was little greater than that in the saline control. This phenomenon was probably a manifestation of the extreme instability of fully sensitised red-cell suspensions and was entirely non-specific. The most reliable results are likely to be obtained with suspensions sensitised with 0·5 M.A.D. of antibody.

DISCUSSION

Mechanism of Reaction

The activity of the rheumatoid arthritis agglutinating factor on several combinations of red cells and specific antibody, but not on unsensitised cells, suggests a complement-like activity.

The experiments described above show that C′1, C′2, and C′3 can be excluded, but that the agglutinating factor and C′4 have many characteristics in common.

Thus the well-marked agglutinating activity in rheumatoid arthritis seems to be due to an augmentation of a normal serum-agglutinating factor described by Gorrill and Hobson (1952). We pointed out that the evidence for that factor and C′4 being the same substance was very strong but could only be circumstantial, since we were dealing with a complex mixture of serum proteins and not with chemically pure substances which could be readily isolated.

The present work confirms many of our earlier findings, and the correlation of raised agglutinating titres with increased lytic titres of C′4 in rheumatoid arthritis supports our suggestion that C′4 has an agglutinating action. Nevertheless this must remain largely a matter of inference in the present state of knowledge of the chemistry of complement.

Clinical Value of Test

The specificity and sensitivity of the test in our hands were comparable with the results obtained by Waaler (1940), Rose et al. (1948), and Heller et al. (1949). We found the test positive in a higher proportion of cases than did Jawetz and Hook (1949) or Ball (1950), and the difference in titre between rheumatoid arthritis and normal sera was greater than that found by Miller et al. (1949).

The differences in sensitivity reported by various workers may be largely due to differences in diagnostic criteria and in selection of cases in the disease group. The rheumatoid arthritis group in the present series contained mainly clinically obvious active cases, most of them in hospital inpatients, and thus represent the more severe forms of the disease. This fact may explain the well-marked sensitivity of the test in this series. In a larger group, including all stages of rheumatoid arthritis, the test would possibly be less sensitive than the present series suggests.

The non-rheumatoid group of cases does not represent an extensive survey of disease, but was designed to include conditions similar to rheumatoid arthritis and normal controls.

Within these limits the reaction was specific enough to distinguish moderately active rheumatoid arthritis from other forms of polyarthritis of equal severity. Other collagen diseases tend to give a positive reaction, but apparently only if there are manifestations of peripheral arthritis. Allergic conditions such as asthma do not give titres above normal values. In 8 of the cases of rheumatoid arthritis investigated so far we have repeated the test at short intervals during cortisone therapy. From these few observations it seems that the agglutinating titre does not fall significantly despite the rapid and well-marked improvement in clinical condition during treatment. Further investigations on this aspect must obviously be made, but at present it does not appear likely that the test will prove of value in assessing the short-term effects of therapy.

SUMMARY

Sera from cases of rheumatoid arthritis contain increased amounts of a heat-stable factor, present in normal serum, which potentiates agglutination of partly sensitised red cells.

This factor is very closely associated in its behaviour and properties with the heat-stable fourth component (C′4) of complement. Inferential evidence of this association is presented.

The lytic titre of C′4 in rheumatoid arthritis tends to be raised above normal levels in cases showing raised agglutinating titres.

The reaction is highly specific for rheumatoid arthritis and is positive in most cases of moderate severity.

Agglutination titres do not reflect the rapid change in clinical activity produced by cortisone.

Increase in the sensitivity of the test is only likely to be achieved at the expense of its specificity.

Our thanks are due to Prof. G. W. Pickering and Dr. R. Lovell, of St. Mary's Hospital; to Dr. A. G. Signy, director of pathology, St. Mary Abbot's Hospital group laboratory; and to Dr. J. Buchan, of the Royal Free Hospital unit of rheumatology, for providing sera from many of the cases of rheumatoid arthritis investigated.

References overleaf

THE DIFFERENTIAL SHEEP-CELL AGGLUTINATION TEST IN RHEUMATOID ARTHRITIS

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The observation that the serum of patients with rheumatoid arthritis agglutinates the sensitised red cells of sheep was first made by Waaler (1940) The factor concerned was found to be unrelated to the heterophil or Forssman antibody, to the antibody of infectious mononucleosis, or to that commonly found in many normal human sera

A similar observation was made, apparently quite independently, in America in 1948 by Rose et al, who devised what they called the differential agglutination test The reaction involves estimation of the agglutination titre of the patient's serum for sensitised and unsensitised sheep cells, and the ratio between the reciprocals of these titres is known as the differential agglutination titre (D A T) A figure of 1 16 or greater seemed to indicate rheumatoid arthritis

The findings of Rose et al were confirmed in America by Sulkin et al (1949), Brown et al (1949), and Jawetz and Hook (1949) A modified test was described by Heller et al (1949), in which the normal agglutinins were previously absorbed with a concentrated suspension of washed sheep cells, and similar modifications form the basis of observations by Ball (1950) in this country and by Svartz and Schlossmann (1950) in Scandinavia

ROSE'S TEST

Rose's differential agglutination test has been used at the Canadian Red Cross Memorial Hospital for about two years on patients drawn from this hospital, from the Postgraduate Medical School at Hammersmith, and from Heatherwood Orthopædic Hospital at Ascot Of the normal control sera, 11 were taken from members of the hospital and laboratory staff and 9 from pregnant women attending the hospital's antenatal clinic

Method

Serum was separated from a sample of venous blood taken with a sterile dry syringe and stored at 4°C Normally the tests were made at intervals of a week, but no appreciable deterioration was found in sera stored even for several months On the day of the tests all the sera were inactivated at 56°C for half an hour

The sheep corpuscles were separated by centrifugation from defibrinated sheep's blood and washed three times in physiological saline solution A 2% suspension was prepared from the packed cells obtained after the third washing.

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The choice of a suitable hæmolytic serum is of considerable importance Commercial horse anti sheep cell serum supplied by Wellcome Laboratories proved generally unsatisfactory, whereas the American 'Difco' rabbit anti sheep-cell serum gave uniformly reproducible results The reason for this is discussed elsewhere (Scott 1951)

Each batch of serum was titrated for its agglutinating power against a 1% sheep cell suspension, and a quarter of the minimal agglutinating dose was used in the test The cells were sensitised by mixing equal volumes of a suitable dilution of the antiserum and of the 2% red cell suspension. The remainder of the red cell suspension was diluted with an equal volume of saline solution for addition to the control tubes.

Each test was set out with two parallel rows of serial dilutions of the patient's serum in a volume of 0 5 ml The first row consisted of ten tubes, each measuring 1 2 cm by 7 5 cm , containing dilutions from 1 4 to 1 2048, and the second row of five tubes with dilutions from 1 4 to 1 64, of the patient's serum To the first row was added 0 5 ml. of the sensitised cell suspension, and to the control tubes an equal volume of the 1% saline suspension, so that the final dilutions of the serum were from 1 8 to 1 4096 and from 1 8 to 1 128 (Very occasionally it was necessary to repeat the test with a more extended series of dilutions.) Racks containing the tubes were placed in a water bath at 37°C for an hour, and afterwards in the refrigerator overnight The results were read next morning immediately after removing the tubes from the refrigerator

The titre in each row of tubes was taken as the last tube to show 1 + agglutination (just visible to the naked eye), and the result or D.A T was the ratio between the reciprocals of these titres For example, if the titre with the sensitised suspension was 1 128, and that with the control suspension 1 8, the D.A T was 1 16 (8/128) The lowest significant titre was taken as 1 16 (Rose et al 1948)

MATERIAL AND RESULTS

More than 700 tests have now been performed, and the results in more than 300 patients and controls are analysed in table I It will be seen that a positive test was obtained on at least one occasion from about 60% of 124 patients diagnosed on clinical grounds as having rheumatoid arthritis of adult type Great care was taken to ensure that the diagnosis was not influenced by the results of the test If possible the diagnosis made before the results of the test were known was accepted, unless it was subsequently amended for some reason other than the D A T If the diagnosis at the time of the test was in doubt, the case was not accepted as one of rheumatoid arthritis unless there was additional evidence such as the findings at synovial biposy The cases which did not satisfy these criteria were included in the group labelled "arthritis (doubtful)," although a number of these were almost certainly cases of rheumatoid arthritis In this group 18% of 50 cases gave positive results

TABLE I—DIFFERENTIAL AGGLUTINATION TITRE IN 333 CASES, INCLUDING 124 OF RHEUMATOID ARTHRITIS

Diagnosis	D A T (1 1–1 8)	D A T + (1 – 16 +)	% Positive	Total
Rheumatoid arthritis	49	75	60 5	124
Still's disease	32	5	13 5	37
Rheumatic fever and rheumatic heart-disease	26	0	0	26
Arthritis (doubtful cases, including some probably rheumatoid arthritis)	41	9	18	50
Degenerative joint disease, synovitis, traumatic and tuberculous arthritis, gout	33	1	2 9	34
Miscellaneous diseases *	39	3*	7 1	42
Normal controls	20	0	0	20
Total	240	93	28	333

* Including 2 cases of disseminated lupus erythematosus and 1 of hepatitis

The next largest group of arthritic patients had Still's disease (rheumatoid arthritis of juvenile type), comprising 37 cases, of which only 13 5% were positive. The result was surprising in view of the close similarity between these conditions, if indeed they can be called separate diseases. Since most of these cases were in inpatients in the special unit for juvenile rheumatism the serum from individual patients was tested on a large number of separate occasions, often with uniformly negative results. If it had been possible to examine the serum from the adult rheumatoid patients as frequently an even higher proportion of positive results would probably have been recorded; but, since most of these were outpatients, their serum could seldom be examined on more than one occasion. That this was in fact the case is suggested by analysis of 28 patients with rheumatoid arthritis whose serum was examined more than once. Of these 21 (75%) had at least one positive test.

Out of 37 cases of Still's disease, on the other hand 25 were examined more than once and these included 4 of the 5 cases in which positive results were recorded.

The 26 cases of rheumatic fever and rheumatic heart disease all gave negative results.

A group of 34 patients with other forms of arthritis included only 1 case showing a titre of 1:16. This was in a woman aged 76 who had had degenerative arthritis for forty years.

The group of miscellaneous diseases included 2 cases of disseminated lupus erythematosus, both of which showed positive titres on at least one occasion and 1 case of hepatitis, which was also positive. The remaining 30 cases included 5 of jaundice (4 of them due to malignant disease) 2 of chorea, 2 of pneumonia 2 of hypertension and 1 each of pulmonary tuberculosis, erythema nodosum mononucleosis, and serologically positive syphilis, with an ill defined group of patients with trivial minor ailments or with no obvious organic disease.

Of the 20 normal controls none gave a higher differential titre than 1:4.

HELLER'S MODIFICATION

The modification described by Heller et al (1949) is based on the above-mentioned observation that the factor responsible for the agglutination of sensitised sheep cells cannot be absorbed by repeated treatment with a washed sheep-cell suspension which will completely remove all demonstrable agglutinins for unsensitised cells.

Method

Sera are heated at 56°C for half an hour to destroy complement. To 0·6 ml. of each serum in a tube measuring 2 × 7·5 cm is added 0·2 ml of a suspension of packed washed sheep cells. The tubes are stood at room temperature for an hour and occasionally shaken, and the serum is then separated by centrifugation. To the supernatant fluid a second volume of 0·2 ml. of sheep cells is added, and the tubes are placed in the refrigerator for at least two hours. The tubes are again centrifuged, and the supernatant serum is used for the test. The period of absorption was longer than that used by Heller et al. (1949) who used two periods of forty minutes at room temperature.

To a row of serial dilutions of the absorbed serum is added an equal volume of sensitised sheep-cell suspension similar to that used in the D.A.T. test. The final dilutions of sera are from 1:8 to 1:1024. A control tube using a 1% suspension of sheep cells was included to ensure that absorption had been complete.

Heller et al (1949) suggest that a titre of 1:28 in the absence of agglutination in the control indicates rheumatoid arthritis. In this series a titre of 1:32 was considered significant since the dilutions started at 1:8 and not 1:7.

Material

The sera used were chiefly those submitted for D.A.T. tests. Only those sera could be used of which sufficient remained after the routine tests had been performed. Of the sera from rheumatoid patients, those which had been found to give a negative D.A.T. were particularly selected and relatively few which were known to be positive for this test were included. No attempt was therefore made to compare the percentage of positive results obtained by the two methods. Instead, the increased sensitivity of this test may be judged by the number of cases which though negative to the D.A.T. test, gave positive results with the modified one. The remaining cases were unselected. The normal controls included 3 sera from patients attending the antenatal clinic.

TABLE II—COMPARISON OF ROSE'S AND HELLER'S TESTS

—	Rose + Heller +	Rose − Heller +	Rose + Heller −	Rose − Heller −	Total
Rheumatoid arthritis	5	9	0	9	23
Still's disease	2	4	2	9	17
Arthritis (doubtful)	2	2	1	8	13
Other diseases	0	6	0	10	16
Normal controls*	0	5	0	7	12
Total	9	26	3	43	81

* Including three sera from pregnant women all of which gave positive results with the Heller test

Results

From table II it can be seen that the test shows an increased sensitivity compared with the Rose test, in patients with rheumatoid arthritis. Of 18 sera from patients with a negative D.A.T. 9 were positive by the modified test.

On the other hand the modified test seems to be far less specific for rheumatoid arthritis, since an appreciable number of sera from different diseases, with or without arthritis, gave positive results as did a number of normal controls. That these included the 3 sera from patients attending the antenatal clinic may be worthy of note although the significance of this observation is doubtful.

It was therefore not considered advisable to use the modified test in place of the D.A.T. test in the differential diagnosis of arthritis.

SIGNIFICANCE OF D.A.T. IN RHEUMATOID ARTHRITIS

The next step in the investigation was to find whether the patients with a positive D.A.T. (1:16 or higher) differed in any other respect from those in whom the test was negative. The factors selected for this comparison

TABLE III—DIFFERENTIAL AGGLUTINATION TITRE IN RELATION TO VARIOUS FACTORS IN 100 ADULT PATIENTS WITH RHEUMATOID ARTHRITIS

—		Differential agglutination titre				Statistical significance
		No < 1:16		No 1:16 +		
		OBS	EXP	OBS	EXP	
Activity	0 ±	9	6·5	8	10·5	$\chi^2 = 2{\cdot}95$ $n = 2$ $0{\cdot}20 < P < 0{\cdot}30$
	+	22	21·6	35	35·5	
	+ +	7	10	19	16·0	
Duration (yr)	1	8	7·2	11	11·8	$\chi^2 = 2{\cdot}216$ $n = 3$ $0{\cdot}30 < P < 0{\cdot}50$
	1–5	10	13·3	25	21·7	
	6–10	12	9·9	14	16·1	
	10	8	7·6	12	12·4	
Age (yr)	15–39	8	7·6	12	12·4	$\chi^2 = 1{\cdot}102$ $n = 2$ $0{\cdot}50 < P < 0{\cdot}70$
	40–59	17	19·4	34	31·6	
	60 +	13	11·0	16	18·0	
E.S.R. mm./hr (Westergren)	0–10	5	4·9	8	8·1	$\chi^2 = 5{\cdot}16$ $n = 3$ $0{\cdot}10 < P < 0{\cdot}20$
	11–20	4	4·2	7	6·8	
	21–40	15	14·1	22	22·9	
	40 +	11	14·8	25	24·2	
Sex	M	8	10·6	20	17·4	$\chi^2 = 1{\cdot}6$[illegible] $n = 1$ $0{\cdot}20 < P < 0{\cdot}30$
	F	30	27·4	42	44·6	

ABLE IV—DIFFERENTIAL AGGLUTINATION TITRE IN RELATION TO AGE IN COMBINED SERIES OF 137 CASES OF JUVENILE AND ADULT TYPES OF RHEUMATOID ARTHRITIS

Age (yr)	D A T <1 16		D A T 1 16+		Statistical significance
	OBS	EXP	OBS	EXP	
0–19	33	20 9	8	20 1	χ^2 = 25 95 n = 3 P = <0 01
20–39	7	8 2	9	7 8	
40–59	17	26 0	34	25 0	
60 +	13	14 9	16	14 1	

were the activity and duration of the disease, the age and sex of the patient, and the erythrocyte-sedimentation rate (E S.R.)

Activity was assessed on the basis of the clinical examination of the patient by the physician concerned at the time that the blood was taken for the test, particular attention being paid to the extent and severity of the arthritis Patients with pain, limitation of movement, and swelling in several joints were included in the group "activity ++." Those with relatively slight symptoms in several joints, or with one joint moderately severely affected, came in the group "activity +." Patients with residual deformities only, and those who had undergone a complete or almost complete remission, having no more than trivial disability in one or two joints, were classed as "activity 0, ±"

The *duration* was taken from the first onset of symptoms of arthritis

The E.S R. was measured by the Westergren method, the figure used being the fall in millimetres at the end of the first hour The rate quoted was that found at, or within a few days of, the time that blood was taken for the test.

The *age* of the patient was taken as that reached at the last birthday when blood was first submitted for examination.

Adult rheumatoid arthritis was defined for the purpose of this study as disease in which the onset was after the fifteenth birthday, patients in whom the onset was before the age of fifteen being classified under the heading of Still's disease

The first 100 adult patients on whom all this information was available were selected for the analysis These were first of all divided into two groups (1) having a D A T less than 1 16, and (2) with a D.A T of 1 16 or higher These groups were then subdivided according to the various factors described above, and the results are set forth in table III

In interpreting the significance of the results the χ^2 test was used (Hill 1948), and the probability of the difference between the observed and expected values being due to chance was arrived at by using Fisher's (1948) table A value of P less than 0 05 being taken as statistically significant, no relation was found between any of the above factors and the presence of a D A T of 1 16 or higher

It should, however, be emphasised that the factor of age is only insignificant when cases of the juvenile type are excluded from the analysis. If the 100 cases analysed in table III are combined with the 37 cases of Still's disease, and subdivided according to their ages, irrespective of the age at onset of the disease, a highly significant difference between the younger and older patients is revealed (table IV) The χ^2 test applied in this instance gives a value of P of less than 0 01, indicating that such a distribution might be expected to occur by chance less often than once in a hundred times

The cases of Still's disease are too few, and the positive and negative results too unevenly distributed, for a statistical analysis similar to that used for the adult group

DISCUSSION

Rose's Test

Comparison of the results obtained in the present investigation with those reported by other workers shows that there is a general agreement on the clinical application of the differential agglutination reaction

The results quoted above, although less clear-cut than those originally reported by Rose et al (1948), are nevertheless encouraging enough to warrant the use of this test in the diagnosis of doubtful cases of arthritis. If the method used by these workers is followed, the reaction seems to be highly specific for rheumatoid arthritis, although less sensitive than their original series suggests Rose and his associates found positive titres in all 27 cases of active rheumatoid arthritis examined, and in 8 of 16 cases of inactive disease. In the present series this close relation to activity was not observed; and, although the test was rather more often positive in active cases, the correlation with activity was not statistically significant.

Jawetz and Hook (1949) examined 78 cases of rheumatoid arthritis by this method and found the test positive in 65% of active cases but only in 13 5% of cases with mild or moderate activity. The proportion of positive results among the active cases agrees fairly well with that found here, but again a relation to activity was observed which has not been confirmed in the present work. It is also worthy of note that, apart from a case of ankylosing spondylitis, the only positive result among the controls was in a case of hepatitis, a finding which also has its parallel in this series

In a similar report by Sulkin et al (1949) the cases were separated into mild, moderate, and severe None of the mild or moderately severe cases of less than a year's duration showed titres above 1 4, but no severe case of similar duration was included No such correlation with the duration of the disease is apparent in the cases reported here

Brown et al (1949) also found an apparent relationship with the duration of rheumatoid arthritis, only 25% o cases of less than a year's duration being positive agains 78% in the group in which the disease had lasted mo than sixteen years These workers also found a rath higher proportion of positive titres in active than inactive cases Of their 83 control cases only 1 showed a titre of 1 16, this being a case of subacute bacterial endocarditis with active rheumatic fever

A small series reported by Miller et al (1949) showed a similar proportion of positive results in 21 cases of rheumatoid arthritis. Several positive titres were also encountered among a small number of control sera, and they concluded that the test had little value in diagnosis. It may be noteworthy that they failed to obtain satisfactory results with 2 Kolmer units of hæmolysin and substituted for this 0 5 agglutinating units. This rather suggests that the hæmolytic and agglutinating titres of the anti sheep-cell serum used for sensitisation must have approximated very closely to one another, and the use of half the minimal agglutinating dose introduces the danger of spontaneous agglutination in control sera This emphasises the importance of choosing a suitable rabbit anti sheep cell serum with a considerable margin between its hæmolytic and agglutinating titres. No antiserum which will not produce a high titre with a known positive serum when employed in a concentration of a quarter of the minimal agglutinating dose should be used

Heller's Test

The results cited above cannot be compared directl with those of Heller et al (1949), because most of th sera used had previously given negative results wit Rose's test However, the increased sensitivity of th modified test was confirmed, although this seemed to accompanied by a loss of specificity, since some of t control sera also gave positive results. This may ha been due to minor differences in technique, althou the period of absorption was longer and the mini significant titre accepted was rather higher than th advocated in the original paper It was therefore considered advisable to replace Rose's test by this particular modification for routine use

Ball (1950) is believed to be the first to record the use of the test in this country A technique similar to that of the Heller test was used, but the results were read both after an hour's incubation at 37°C and after subsequent refrigeration for eighteen hours. Just under 50% of the results were positive when the test was read at one hour the presence of any detectable agglutination at this stage being regarded as positive An increase of sensitivity was obtained by reading results after refrigeration, when a titre of 1 32 was accepted as significant. This was, however, accompanied by a loss of specificity and Ball therefore advocates reading the result after one hour The loss of specificity agrees with the findings in the present work, and by reading the test at one hour the sensitivity seems to be reduced below that of Rose's original test as used here, without any compensating increase in specificity

Svartz and Schlossmann (1950) using a method similar to that of Heller found 90% of 180 cases of rheumatoid arthritis positive About 4% of the controls were positive, but these included 3 cases of disseminated lupus erythematosus. More than a third of the controls gave doubtful results Of 9 joint fluids from cases of rheumatoid arthritis, 6 gave positive results. Treatment with cortisone and A.C.T.H did not seem to influence the reaction. The exact criterion used in assessing positive and doubtful results is not described, but the test is said to be positive if hæmagglutination shows about the same titre before and after absorption with normal cells.

Without experience of the exact technique used by Svartz and Schlossman, a detailed assessment of their results cannot be made, but experience of a closely similar test does not lead one to expect the high degree of specificity which they claim for the reaction. Should their findings be confirmed the increased sensitivity of such a test would of course make it even more valuable than the original Rose's test

CONCLUSION

On a basis of the results reported here it is concluded that estimation of the differential agglutination titre, as used by Rose et al. (1948) has a definite place in the differential diagnosis of arthritis. A strongly positive result is almost pathognomonic of rheumatoid arthritis, if disseminated lupus erythematosus and hepatitis are excluded. A negative test on the other hand, has no excluding value since about 40% of known cases of rheumatoid arthritis gave negative results

I am indebted to Dr E G L. Bywaters, director of the research unit, who first suggested that the test should be used, for much helpful advice and criticism and for providing the clinical information necessary for the statistical analysis on his patients from the Postgraduate Medical School of London. I also wish to thank Mr L. A Key and Mr G P Arden for submitting many samples of blood from their patients for D.A.T estimations, and Dr L E Glynn, director of pathology for advice and encouragement at all times.

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THE ANTENATAL PREDICTION OF HÆMOLYTIC DISEASE OF THE NEWBORN

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Although serological evidence of sensitisation in a rhesus-negative woman indicates the possibility of hæmolytic disease in her child, the probability of this event is difficult to assess. Changes in titre of the maternal antibodies are unreliable evidence (Diamond et al 1950) and biochemical changes in the mother's serum are equivocal

A preliminary survey of the help obtained from analysis of the liquor amnii obtained at artificial rupture of the membranes indicated that further investigation was warranted (Bevis 1950), but that specimens should be obtained earlier in pregnancy In the present investigation amniotic fluid was obtained by abdominal paracentesis starting at the 28th week and repeated at fortnightly intervals until delivery The specimens were extensively investigated chemically but only the non hæmatin iron and the urobilinogen concentrations proved of prognostic value.

METHODS

Paracentesis—A point midway between the umbilicus and the symphysis pubis is infiltrated with 1% procaine, care being taken to avoid large skin vessels. Uterine paracentesis is then done with a spinal needle (gauge 20), and the liquor amnii is aspirated into an all glass syringe, about 3 ml. being withdrawn The puncture is then sealed with plastic The technique is the same as that used in spinal puncture, but the syringe must be chemically clean as well as sterile

Analysis—Specimens were examined as soon after collection as possible but storage overnight at a temperature of 5°C does not affect the results.

Urobilinogen—The method used is that of Watson (King 1951) 1 ml. of liquo amnii being used and the volume of reagents being reduced proportionally The standard used was Terwen's Readings were taken on a single-cell photo-electric absorptiometer (Gallenkamp no 3615) using an Ilford filter no 625 (yellow green) and a Chance ON 20 filter to remove the infra red rays.

Non-hæmatin Iron.—Many methods of estimation have been tried; but as the amount of iron present is small compared with the amount of serum and the liquor

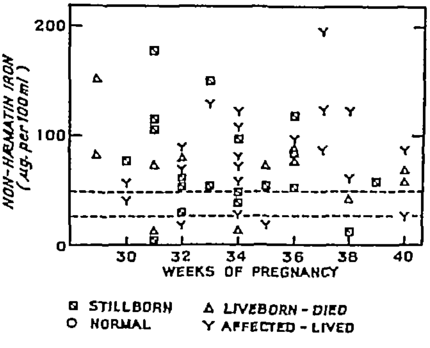

Fig 1—Non-hæmatin iron in liquor amnii at different stages of pregnancy Interrupted lines show mean and upper limit of normal (24 7 ± 10·4 µg per 100 ml.) calculated from controls and unaffected cases.

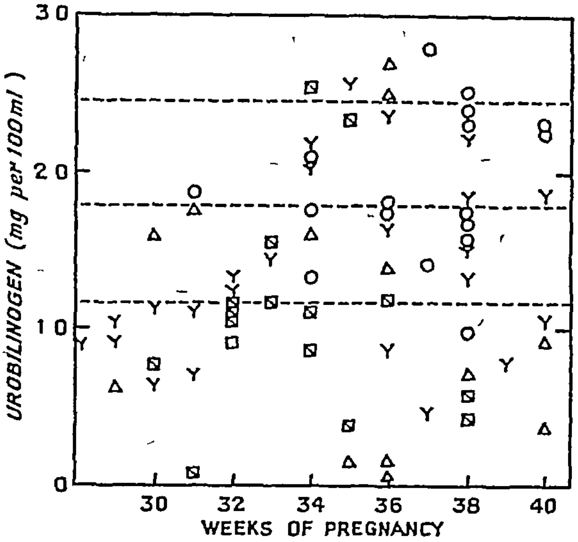

Fig 2—Urobilinogen in liquor amnii at different stages of pregnancy Interrupted lines show mean and limits of normal (1 79 ± 0 32 mg per 100 ml) calculated from normal cases Key as in fig 1

amnii is sometimes stained with meconium, and the proteins are difficult to precipitate completely, the most effective method is one modified from those described by Kitzes et al (1944) and Thompson (Sandell 1950)

1 ml of liquor amnii is heated in a bath of boiling water for five minutes to denature the proteins, and 0 2 ml of 50% trichloroacetic acid is added and the heating continued for a further five minutes The tube is then cooled and centrifuged at 4000 r p m for five minutes 1 ml of the supernatant fluid is transferred to a stoppered tube or volumetric flask (5 ml), and 1 drop of 10% potassium permanganate solution is added 2 ml of iso butyl alcohol and 1 ml of 10% potassium thiocyanate are now added, and the tube is shaken for one minute and the alcohol allowed to separate The coloured layer is next transferred to a cuvette, and water droplets are removed by adding a few milligrammes of anhydrous sodium sulphate The absorption is then measured with an Ilford filter no 623 (blue green) A standard and a blank are run through at each determination.

The colour in butyl alcohol is stable, and the extraction is recommended as a routine (the alcohol can be recovered by distillation), but, if time is of great importance, the extraction may be omitted and the colour stabilised by the addition of 1 5 ml of acetone It must be emphasised, however, that the slightest turbidity in the solution will cause appreciable error in the results

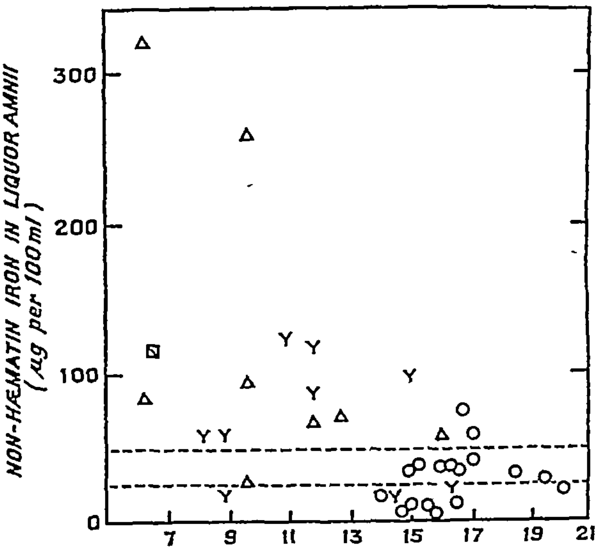

Fig 3—Non hæmatin iron in liquor amnii shortly before delivery Key as in fig 1

All reagents must be of analytical grade, and water used for cleaning and the preparation of solutions is glass-distilled.

Glassware (including syringes, specimen tubes, and cuvettes) can be effectively cleaned by immersion in a hot 5% solution of 'Lissapol' in 5% hydrochloric acid for five to ten minutes followed by six washes with glass distilled water This seems to be more effective than the usual dichromate cleaning

RESULTS

158 specimens of liquor amnii from 69 patients were examined 54 of the patients were sensitised rhesus negative women and, of these, 30 gave birth to children with hæmolytic disease of the newborn

In spite of repeated paracentesis no ill effects were noted in the mothers apart from slight abdominal discomfort for four to six hours, which was never severe enough to stop the patient from doing her normal housework Great attention was paid to possible effects of aspiration on the fœtus, but no case of premature labour or stillbirth could be ascribed to the procedure, and there was no evidence of skin trauma in the infants

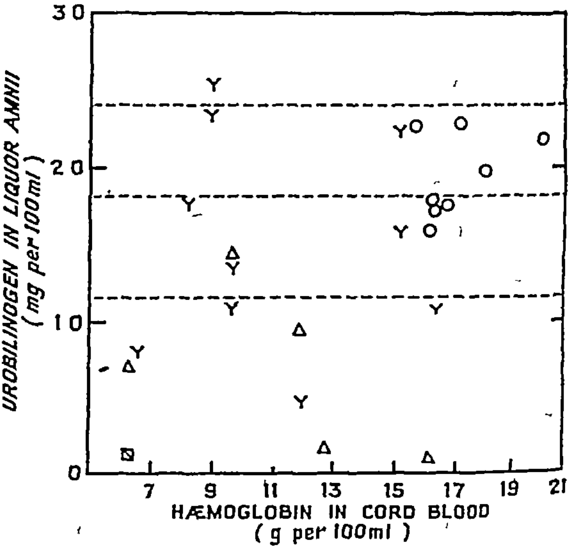

Fig 4—Urobilinogen in liquor amnii shortly before delivery Key as in fig 1

The results of the estimations of non-hæmatin iron and urobilinogen are shown in figs 1 and 2, which show that the hæmolytic process produces well marked changes in the concentrations of these substances. Figs 3 and 4 show that these concentrations offer some guide to the severity of the disease The ultimate fate of the children has been difficult to assess because most of the affected babies were treated in the Medical Research Council trial of methods of treatment in hæmolytic disease of the newborn, and minor degrees of kernicterus in surviving children may have been masked by routine blood-transfusions

Mollison and Cutbush (1951) have shown that the degree of severity of the disease can be expressed as a sigmoid curve capable of probit analysis As this curve is that found in dose/mortality experiments, the results for iron and urobilinogen have been expressed similarly The concentration of iron in the liquor amnii proved to be fairly constant throughout the period of pregnancy covered by this investigation (all the constituents of the liquor amnii varied from week to week), and, although the concentration found just before delivery does not fit the curve, the highest concentration in the period under review

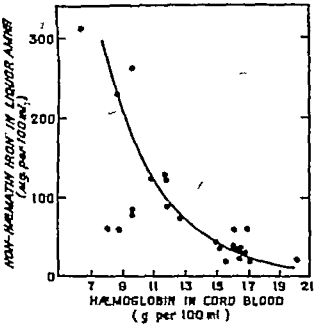

Fig 5—Highest concentration of non-hæmatin iron in liquor amnii recorded for each case.

agrees closely with the curve (fig 5) As this curve is linear when plotted on a logarithmic scale (fig 6) the estimation of iron appears to be of great value in assessing the result for the fœtus.

The urobilinogen concentration does not behave in the same way but considerable help is given by the fact that disease of the fœtus was always accompanied by a sudden although often transitory decrease in the concentration This decrease in concentration does not indicate clearly the degree of the hæmolytic process, but a large decrease is of very grave significance

The concentrations of bilirubin and biliverdin in the liquor amnii do not give any idea of the severity of the disease, nor do they bear any definite relation to the colour of the liquor The relation of the "icteric index of the liquor to the severity of the disease is shown in fig 7 The pigment responsible for the yellow colour has now been identified as mesobilifuscin.

DISCUSSION

It is now known that the liquor amnii is not a static fluid, but that its water-content is changed hourly (Flexner and Gellhorn 1942) although other constituents remain for a longer period Also since iron reaches the liquor within forty minutes of administration to the mother (Pommerenke et al 1942) the liquor is apparently produced by an active secretory process rather than by dialysis. The secretion is probably from the placenta, but it is likely that the amnion plays some part in the process (Kropp 1940) The rôle of fœtal metabolites in the production of the fluid is obscure, but probably some reach the liquor through the skin and lungs, and some possibly through the kidneys

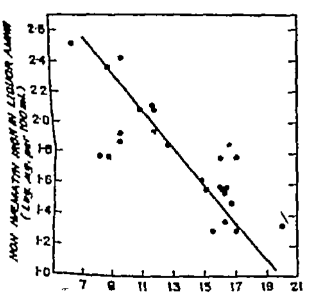

Fig. 6—Points of fig 5 on logarithmic scale. Regression line is calculated from recorded values. The hæmoglobin in the cord-blood = 25·4 minus 8·4 log Fe.

The concentration of some of the constituents of the liquor are shown in the accompanying table, and the variation in these amounts suggests that an active process is in operation rather than a purely physical transfer across a membrane.

So far as hæmolytic disease of the newborn is concerned the only definite trends observed are those of non hæmatin iron and urobilinogen and these have been indicated in the results.

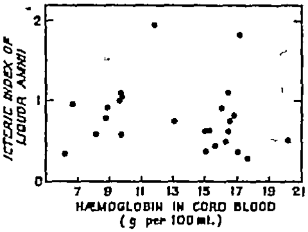

Fig 7—"Icteric index of liquor amnii. There is no correlation between this value and the hæmoglobin content of the cord-blood

Winternitz (1920) studied the concentration of urobilin in the fœtus and concluded that there was no evidence of a parenteral source, and that the major part found in the fœtus was absorbed from the maternal blood stream More recent work on this subject is lacking but it seems likely that fœtal erythrocytes disintegrate before term and that therefore some degradation of hæmoglobin does take place in the fœtus The work of London et al. (1950) has shown that the output of bile pigments in adults is not entirely accounted for by the destruction of mature erythrocytes, and there is some evidence that the reticulo-endothelial system plays an obscure part in this.

Knowledge of iron metabolism has increased rapidly over the past few years, but here again there are wide gaps in our knowledge These gaps are particularly obvious in iron excretion, although there is evidence that large proportions are excreted through the skin (Vanotti and Delachaux 1949) It is therefore clear that, although knowledge of the production of the amniotic fluid is still incomplete these findings offer an explanation for the results in the present investigation.

COMPOSITION OF LIQUOR AMNII

Constituent	Reference					
	Shrewsbury 1933	Tankard et al. 1934	Makepeace et al. 1931	Cantarow et al. 1933	Uranga Imaz and Gascon 1950	Bevis
Chloride	540–670	600	622	—	360	508
Sugar	0–91	—	33	0–69	40	27
Protein	25–600	350	233	530	210	446
Cholesterol	Nil	—	—	—	19	8–63
Urea	10–73	100	—	—	30	12–37
Bile pigment	Nil	—	—	—	—	0–2·5
Icteric index	—	—	—	—	—	0·[illegible]–7·0
Urobilinogen	—	—	—	—	—	1·79
Lævulose	—	—	—	—	—	0–11
Iron	—	—	—	—	—	30 (µg.)
Copper	—	—	—	—	—	1·4–120 (µg.)

All values are mg per 100 ml except where stated and refer to mean values at term except where the range is given.

The findings for 8 stillbirths where reliable hæmoglobin estimations could not be done were

Urobilinogen 0·55 ± 0·47 mg per 100 ml
Non hæmatin iron 102 ± 113 µg per 100 ml

Both these means are significantly different from the normals.

It will be seen from figs. 1 and 2 that the changes in the liquor amnii are apparent at the 30th week of pregnancy when the fœtus is being affected. An abnormal concentration of either iron or urobilinogen at this time is therefore to be taken as a warning that the fœtus is being affected by the hæmolytic process, and appropriate decisions can then be made

SUMMARY

The results of analysis of the liquor amnii taken at various times in pregnancy indicate that the concentrations of non-hæmatin iron and urobilinogen offer a reliable guide to the outcome for the fœtus

Methods of analysis and for obtaining specimens are described, and it is shown that the iron concentration tends to follow a sigmoid curve The implications of this are briefly discussed

Thanks are due to the trustees of the Leverhulme Research Fund and the Royal College of Obstetricians and Gynæcologists for a grant to perform this work, to the consultant staff at Saint Mary's Hospitals for referring cases to the clinic and to all members of the medical and nursing staff for their coöperation

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TENSION PNEUMOTHORAX FOLLOWING TRACHEOTOMY

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THE fact that mediastinal emphysema and tension pneumothorax may sometimes develop after an incision has been made in the neck is well established The subject has been admirably reviewed by Reading (1949), who cites two cases following tracheotomy and two following thyroidectomy with associated abductor cord palsy Champneys (1882), when investigating the relative efficiency of various forms of artificial respiration in stillborn children, noticed that after tracheotomy mediastinal emphysema developed in every case and pneumothoraces in some Michels (1939) recorded six cases following tracheotomy Forbes and Salmon (1943) reported on fourteen cases of post-tracheotomy mediastinal emphysema, eight of which developed spontaneous pneumothorax Barrie (1940) collected four cases of tension pneumothorax seen at necropsy after thyroidectomy Billimoria (1947) reported a case in which bilateral pneumothoraces occurred during a partial thyroidectomy This was thought to be due to damage to both pleuræ, although no tell-tale hiss was heard It seems that if there had been a temporary obstruction of the airway used for giving the anæsthetic, these could have occurred through the mechanism as outlined below

No apology is made for reporting yet two more cases, for the condition is still widely unknown and may account for a high proportion of unexplained deaths following otherwise successful tracheotomy

CASE-RECORDS

Case 1 —A healthy male infant, aged 7½ months, was transferred urgently from another hospital to the thoracic surgical unit at Baguley Hospital There had been a history of sudden respiratory distress, attributed to the inhalation of a foreign body Bronchoscopy at the first hospital had found no foreign body but had given some relief

On admission the child was fairly comfortable but had a loud stridor and some indrawing of the chest wall. He was bronchoscoped under a general anæsthetic (Mr J S Glennie), and a piece of rolled up leaf 1 in long was removed from the trachea

Progress —Next day the child developed an œdema of the glottis as the result of the two bronchoscopies, and at 3 P.M. a tracheotomy was necessary This produced immediate relief, and the child was comfortable until 8 P.M Shortly after the inner tube had been cleaned at this time the child's condition suddenly deteriorated, he became grey blue and restless. The tube was inspected, and it was not clear whether it was working satisfactorily or not Oxygen was blown down the tube, the tube was sucked out, and nikethamide was given, but in a few minutes the child was dead At the time it was thought that a residual piece of leaf or a piece of blood-clot had been dislodged and had fallen across the carina.

Necropsy, however, showed that the airways were patent. Both lungs were completely collapsed, and there were bilateral pneumothoraces There was severe mediastinal emphysema, with a little surgical emphysema at the neck

Case 2 —A girl, aged 5 years, was admitted as an urgent case to the ear, nose, and throat ward of the Park Hospital, Davyhulme, with an acute laryngo tracheo bronchitis. She had pyrexia, was deeply cyanosed, and was making violent inspiratory efforts with drawing in of the intercostal spaces, and there was clearly much laryngeal obstruction. A low tracheotomy was immediately done, the child's colour improved, and breathing became peaceful

Progress —Three hours later I was asked to see her She had been quite happy until a short while before, when the breathing had again become difficult, and the colour had deteriorated On examination she was slate coloured and making violent inspiratory efforts, her pulse was rapid and of poor volume, and her skin cold, there was surgical emphysema of the neck Oxygen was being administered through a catheter in the tracheotomy tube At first it was not clear whether the tracheotomy tube was still in situ, because air still seemed to be going in and out. The patient was certainly very close to death, and after the experience of case 1 the diagnosis was not difficult

A needle was plunged alternately into each side of the chest, and each time there was a short hiss of air escaping under pressure The child was taken to the theatre, the tracheotomy wound was laid open, and it was seen that the tube was lying in front of the trachea. It was reintroduced through the tracheal opening There was little improvement A needle attached to an artificial pneumothorax machine was plunged into the left chest in the anterior axillary line high up A positive reading was obtained, and 400 ml. of air was withdrawn. The effect was dramatic The colour changed to a healthy pink in a few minutes The process was completed by taking off 400 ml of air from the right chest

Radiography showed well the small residual bilateral pneumothoraces and the emphysema of the mediastinum and neck.

With the aid of antibiotics, the child made an uninterrupted recovery

DISCUSSION

Reading (1949) explains that, in the presence of a neck wound involving the pretracheal fascia, such as a tracheotomy or thyroidectomy wound, if respiratory obstruction occurs, as when the tracheotomy tube slips out of the previously obstructed air-passage, then, with the ensuing violent inspiratory efforts, air is sucked into the wound and down into the mediastinum, where it is trapped More and more air comes in until it breaks out into one or both of the pleural cavities

The site of rupture in the mediastinal pleura has been shown by Ehrenburg (1932) and Macklin (1937) to be either over the thymus anteriorly or between the vertebral column and the œsophagus Once rupture has occurred, death comes rapidly unless two steps are quickly taken (1) the patency of the airway must be reinstated, and (2) the air in the pleural cavities must be let off either through cannulæ connected to underwater seals, or by an artificial pneumothorax machine (probably not the best method) or by any means which can be devised with whatever is handy

Air hissing *around* the tracheotomy tube may give the impression that the tube is still in position, but blowing oxygen under pressure into the tube (which is the natural impulse) will make the condition worse if the tube is mal placed.

If it is realised that the tube has slipped out and only this is remedied and the pneumothoraces are missed, the patient may die

As Reading (1949) points out, the surest way of fore stalling a tragedy is to ensure that the tracheotomy tube will not slip out of position.

I wish to thank Mr A. Graham Bryce and Mr L. D Mercer for permission to record these two cases.

ADDENDUM

Since completing this article I have treated a further case by the method described above, which averted death

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ALLOPREGNANE-3β 20β-DIOL AS A STANDARD FOR DETERMINATION OF URINARY PREGNANEDIOL

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In the routine determination of urinary pregnanediol by the sulphuric-acid colour reaction it has naturally been the custom to use pregnane-3α 20α-diol as a standard, since this is the principal constituent of the human urinary diol fraction (Talbot et al. 1941 Guterman 1944, 1945 Sommerville et al 1948a and b see also Haslewood 1950) Recently it has been shown in this laboratory (Brooks et al 1951) that *allo*pregnane-3β 20β-diol is an important constituent of the diol fraction of pregnant mares urine.

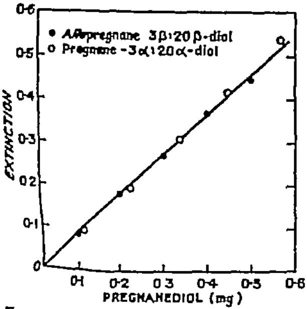

Fig. 1—Absorptiometer readings for colours produced by pregnane-3α : 20α-diol and *allo*pregnane-3β : 20β-diol with 10 ml of concentrated sulphuric acid.

We have studied the reaction of this diol with concentrated sulphuric acid and have found that it gives the same colour as does the human 3α : 20α isomer both qualitatively and quantitatively Since *allo*pregnane 3β : 20β-diol can easily be obtained by partial synthesis from pregnenolone which is commercially available, this isomer provides a cheap and convenient standard for use in routine determinations of urinary pregnanediol, and saves the labour of making pure pregnane-3α 20α-diol in quantity The 3β 20β isomer should not be used in research work on the development of methods for determining pregnanediol or in checking the accuracy of existing procedures—e g in recovery experiments.

We have also found that *allo*pregnane-3β : 20α diol and uranediol (17 methyl-*D* homoandrostane 3β 17α diol) (Klyne 1950) give, with concentrated sulphuric acid colours very similar to those given by the two diols named above

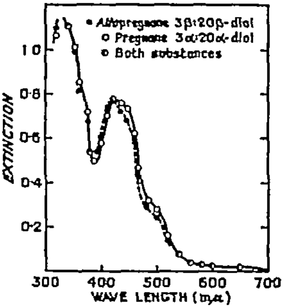

Fig 2—Absorption spectra of colours produced by pregnane-3α : 20α-diol and *allo*pregnane-3β : 20β-diol ; 0·5 mg in concentrated sulphuric acid 10 mL. The two curves are identical below 380 mμ and above 520 mμ.

EXPERIMENTAL

Pregnane 3α 20α-diol and *allo*pregnane-3β 20β diol were made to react with sulphuric acid as described by Sommerville et al. (1948a) The pregnane-3α : 20α-diol used was prepared from human pregnancy urine and had a melting point of 237–238°C. *allo*Pregnane-3β 20β-diol was prepared from pregn-5-en-3β ol 20-one acetate by catalytic hydrogenation (Klyne and Barton 1949) and had a melting point of 194–195°C Colours produced by different quantities of the two diols were measured with a Hilger Spekker absorptiometer using Ilford Spectrum violet filter no 601 and a 1 cm cell. The results for a typical experiment (fig 1) show that points for quantities of the two compounds up to 0 5 mg lie very close to the same straight line The values for the ratio of the weight of pregnanediol in milligrammes to extinction, calculated for the samples represented by the points in fig 1 were as follows for the 3α : 20α-diol 1 18, 1 13, 1 09, 1·08 1 05 and for the *allo*-3β 20β diol, 1 18 1 12 1 11 1 09 1 12

The absorption spectra of the colours from 320 to 700 mμ. were measured on the Beckman spectrophotometer, Model D U the curves (fig 2) are identical except for slight differences at about 390 and 430 mμ.

SUMMARY

*allo*Pregnane 3β 20β-diol may conveniently be used instead of pregnane-3α : 20α-diol as a standard in the determination of human urinary pregnanediol by the sulphuric acid colour reaction

We are indebted to N V Organon, Oss, Netherlands, for the pregnenolone acetate used, and to Mr J P Newhouse for preparing pregnane-3α : 20α-diol *allo*Pregnane-3β : 20β-diol may be obtained from Organon Laboratories Ltd., Brettenham House Lancaster Place, London, W C.2.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Drug Resistance of Micro-organisms

THE pathology section of the Royal Society of Medicine met on Feb 5, under the chairmanship of Prof WILSON SMITH, F R S , president of the section

Prof L P GARROD drew attention to the universality of the phenomenon of drug resistance Thus not only do bacteria become resistant to chemotherapeutic agents, but flies become resistant to D D T , and man to morphine Among bacteria, he said, resistance is most likely to develop with those drugs which have the most subtle and selective action and are, therefore, the most useful chemotherapeutic agents, although it can also occur with a general protoplasmic poison such as phenol

Professor Garrod then showed a chart to illustrate the increasing incidence of infective processes due to strains of bacteria resistant to sulphonamides, penicillin, streptomycin, aureomycin, chloramphenicol, and terramycin So far, however, the meningococcus has a clean sheet, no drug-resistant strains have been reported from infective processes (although antibiotic-resistant, if not sulphonamide-resistant, strains of this species can be developed in the laboratory) Sulphonamide-resistant gonococci appeared rapidly, but so far this species has remained sensitive to the antibiotics Many strains of *Streptococcus pyogenes* are now resistant to sulphonamides, and even more to streptomycin , but so far nearly all strains of this species are sensitive to all of the five main antibiotics Pneumococci are similar, except that some resistant to penicillin are now appearing The position with regard to *Staphylococcus pyogenes* is much more serious A very large number of strains of this species are now resistant to sulphonamides, penicillin, and streptomycin , and there is a steadily rising incidence of strains resistant to the other three antibiotics The position with regard to enterobacteria is similar to that of *Staph pyogenes*, except that the former never were sensitive to penicillin

Discussing the possible causes of this increase, Professor Garrod emphasised the importance of strain selection, which was made clear by the work of Schmith and Reymann [1] in relation to sulphonamide resistant strains of gonococci and that of Barber and her colleagues [2] with regard to penicillin-resistant staphylococcal infection When a single bacterium shows a change in drug sensitivity there are two possible explanations—mutation [3] or adaptation [4] Some have suggested that the adaptation hypothesis falls to the ground because it is contrary to orthodox views of heredity In the view of Professor Garrod this is no valid objection, for it has never seemed to him that these laws apply to such organisms as bacteria which multiply by binary fission Professor Garrod suggested that perhaps the mechanism differed with different antibiotics

With regard to streptomycin, it has been shown by Alexander and Leidy [5] (and a year earlier by Klein and Kimmelman[6]) that a given population of a single streptomycin sensitive species may contain a few cells that are resistant During early studies of the treatment of urinary infections with streptomycin, Professor Garrod inoculated streptomycin plates with the centrifuged deposit of large volumes of urine, to see whether with such massive inocula a few resistant variants could be isolated In 18 patients the result of such cultures prepared from pre-treatment specimens were compared with response to treatment From 2 such patients numerous streptomycin resistant colonies were isolated, and neither of these patients responded to treatment , 4 yielded a few resistant colonies, and all responded to treatment , 14 yielded no resistant colonies, and 12 of these responded to treatment

Finally Professor Garrod discussed cross resistance to antibiotics With aureomycin and terramycin this is common , bacteria, particularly gram-negative bacilli, which have developed resistance to one are liable to be resistant to the other On the other hand exposure to neomycin may render a bacterium more sensitive to aureomycin and terramycin, and to a lesser extent to chloramphenicol Recently workers at Johns Hopkins University [7] have shown that exposure of a penicillinase-producing organism to aureomycin, chloramphenicol, terramycin, or streptomycin suppressed its capacity to produce penicillinase—an effect which persisted after many successive generations in the absence of antibiotics The suppression was most pronounced with gram negative bacilli, but occurred to some extent with a strain of penicillinase producing *Staph pyogenes*

In conclusion Professor Garrod said that he is appalled by the amount of work that the clinical pathologist has to do for the adequate laboratory control of chemotherapy

Mr E F GALE, SC D , discussed the mechanism of drug resistance from the point of view of the biochemist He described the work of Umbreit and his colleagues [8] showing that streptomycin inhibits oxalacetate pyruvate condensation, thus inhibiting the citric acid cycle This is the main path of oxidation in streptomycin sensitive bacteria , streptomycin resistant strains, however, have another method (These workers suggest that the reason animal-tissue cells, which use this method of oxidation, are not affected by streptomycin is that the antibiotic does not penetrate the cell wall Under certain conditions in vitro, streptomycin was shown to inhibit oxalacetate pyruvate condensation of tissue (e g , liver) homogenates.

The above hypothesis could account for a one step increase in resistance In many instances, however, bacteria become resistant by stages Luria [9] has shown this to occur with staphylococci when they are grown in increasing concentrations of sulphonamides Dr Gale suggested that each " step " may be associated with a different biochemical mechanism Thus one may be associated with an increase in the capacity of the bacterium to synthesise *p* aminobenzoic acid, another with a loss of power to synthesise methionine and therefore a metabolism not concerned with the use of *p* aminobenzoic acid, and so on

Dr Gale touched briefly on his own work [10] in relation to staphylococci " trained " in vitro to grow in increasing concentrations of penicillin In his view penicillin prevents the passage of glutamic acid into the cell, resistant strains are still unable to assimilate glutamic acid but have acquired the capacity to synthesise it.

In conclusion Dr Gale suggested five mechanisms by which a bacterium could resist the action of a drug (1) the bacterium may destroy the drug , (2) the drug may be unable to penetrate the cell wall , (3) resistance may be associated with increased production of an enzyme substrate , (4) the bacterium may develop alternative metabolic pathways , or (5) there may be a mutational loss (or gain) of an enzyme As time goes on the truth of the matter will probably emerge as something very much more complicated

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Prof R KNOX began by saying that unless one wished to be branded as a Lamarckist, or worse still a Lysenkoist, there were only two hypotheses to explain the acquisition of drug resistance—enzymic adaptation or natural selection With enzymic adaptation there is a homogeneous population, all the cells of which are changed by the environment the change occurs rapidly and disappears on removal of substrate Natural selection, on the other hand occurs in a population which is not homogeneous but contains a few cells differing from the rest resistance (of the whole population) usually develops slowly but once developed is relatively permanent. The two processes are not antithetical, and adaptive processes may be the mechanism by which natural selection becomes operative.

Penicillinase Professor Knox continued, is an adaptive enzyme. In an investigation of the bacterial reduction of tetrathionate[11] he has shown that adaptive processes may be subject to temperature. Some recent experiments by Professor Knox indicate that *Bacillus cereus* (a penicillinase producing organism) produces much less penicillinase at 42°C than at 37°C If the cells are first grown in penicillin at 37°C before testing at 42°C and 37°C the difference is abolished. Professor Knox further suggested that one reason for prevention of resistant bacteria by the use of two chemotherapeutic agents might be that the second inhibited an adaptive mechanism relative to the first

Lastly Professor Knox referred to the association of age of culture and antibiotic sensitivity In broth cultures of *Staph aureus* in test-tubes, he said growth became very slight after 18 hours' incubation, because of oxygen lack Such a culture is less sensitive to antibiotics than one that is actively growing By transferring such 18 hour cultures to flasks, thus giving a shallow layer of broth, oxygenation is increased; and Professor Knox has found that growth once more becomes rapid and sensitivity to antibiotics is restored.

Professor GARROD asked Dr Gale why failure of assimilation of glutamic acid—the supposed mechanism by which penicillin acts—should kill bacteria in as short a time as 10 minutes. Dr GALE replied that bacterial metabolism is extremely rapid and that any mechanism which throws the chain of reactions out of gear is likely to have a quick effect

Dr GALE, who was asked why development of drug resistance was sometimes associated with change of bacterial species, replied that loss of a specialised characteristic might well occur in conjunction with a throw back to an earlier evolutionary type

Dr M. R. POLLOCK suggested that biochemists searching for the mode of action of a drug find certain metabolic reactions partly or completely inhibited and too quickly jump to the conclusion that these are decisive changes whereas, of course, a drug may act on a large number of enzyme reactions. He said that although the discussion had not as he had thought possible, developed into an argument between Michurinists and Mendel Morganists it was very important in this connection to use clearly defined terms. Thus for example what occurred in a bacterial population should not be confused with changes in a single cell He further suggested that if plasma genes exist there might be competition between intercellular particles

Dr J UNGAR asked a question which he declared was of major practical importance: What should be done with regard to penicillin resistant staphylococci and streptomycin resistant tubercle bacilli?

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Reviews of Books

Handbook of Surgery

R C B LEDLIE, F.R.C.S surgeon, Royal Cancer Hospital London; MICHAEL HARMER F.R.C.S., assistant surgeon, Royal Cancer Hospital London Baillière Tindall & Cox. 1951 Pp 536 21s

THIS small textbook sets out to summarise and to put into perspective the vast and increasing mass of surgical knowledge It succeeds well, but it cannot, in 500-odd fairly small pages printed in pleasantly legible type, enter into detail or controversy It would not (and is not intended to) help with practical diagnosis and treatment of individual cases, because it is concerned, like a small scale map with principles and direction. A chapter of three pages covers chemotherapy in surgery, and it is astonishing how much of the essential information is packed into this space The only fault with the excellent line diagrams is that there are not enough of them In a short didactic textbook any reviewer can find dogmatic statements with which he does not agree; but it is unfair to stigmatise as half truths points which the writers have not room to qualify or to support with argument. This book shows that two authors can still cover usefully and with a very fair balance the whole field of surgery

Genetics in the 20th Century

Essays on the Progress of Genetics During its First 50 Years Editor: L. C. DUNN New York and London Macmillan. 1951 Pp. 634 37s 6d.

THE 26 essays collected in this volume are papers presented at the golden jubilee of genetics at Ohio State University, Columbus, Ohio in September 1950 In the half-century since the rediscovery of Mendel's work, genetics has come to occupy a central position in the theoretical and applied biological sciences. These essays are a useful survey of the progress and main trends in the more important fields, and their relations to other sciences. The individual papers differ a good deal from each other in that some lay stress on the historical development, others survey mainly the present situation, while others again try to point the way to future progress The general standard of the contributions is high, and the authors are without exception recognised authorities in their various fields. Of special medical interest are the essays of M. R Irwin on genetics and immunology, J Lederberg on genetic studies in bacteria, L. S Penrose and L. H Snyder on human genetics J W Gowen on genetics and disease resistance and C C Little on genetics and cancer

Decompression Sickness

Compiled under the auspices of the Subcommittee on Decompression Sickness Committee of Aviation Medicine, Division of Medical Sciences National Research Council Washington. Chairman: Prof J F FULTON M.D Philadelphia and London: W B Saunders. 1951 Pp 437 42s 0d

This book compiled by eminent workers, offers some interesting lines of thought for those engaged in research. During the late war research into decompression sickness absorbed much of the time of those responsible for the care of flying personnel in the United Kingdom and North America. In the later stages the advent of the pressurised cabin drew attention away from this problem; and since the war the subject has been increasingly neglected Interest is reviving however since it is now clear that devices such as pressure-cabins are liable to fail either because of structural weakness or of enemy action Moreover the jet engine will push an aircraft much further for a given fuel load at high than at low altitude.

Most of the human decompression experiments discussed in this work were done with a view to war-time selection or education of aircrew very often with special flying rôles in mind They were not all planned therefore to give good statistical material nor were symptoms classified to any standard pattern, and they apply only to men of aircrew age moreover the pattern of experiments fitting for 1940–45 aircraft is no longer suitable for the needs of 1952 The hypotheses of the ætiology of the condition, however, and of prophylaxis by previous denitrogenation, given by Nims, Bateman, and Jones, have contemporary significance, These hypotheses differ in more than detail That of Jones, based on experiments with radioactive tracer gases, seems to be much too dogmatic that of Bateman is to be preferred Nims, who has added the concept of "deformation pressure of the tissues," has made a very real contribution Interest has turned to post-decompression shock, a condition of rapid—and sometimes irreversible—hæmoconcentration after decompression, either at altitude or in a decompression chamber Symptoms during the period at low pressure are not necessarily severe Why decompression sickness, which is normally cured by return to high pressure, should very occasionally lead to this fatal condition is not explained by any of the hypotheses If future research can provide an answer, new light may be shed on the pathology of shock itself This problem, and the wide differences in the symptomatic susceptibility of individuals, suggest that the one and only sure ætiological factor is reduction of pressure

Diagnosis and Treatment of Intrathoracic New Growths

MAURICE DAVIDSON, M.A., D M, F.R C P, consulting physician, Brompton Hospital for Consumption, DAVID W SMITHERS, M D, D.M.R., professor of radiotherapy, University of London, OSWALD S TUBBS, M.A, M.B, F.R.C S, *thoracic surgeon, St Bartholomew's Hospital* London Oxford University Press 1951 Pp 260 42*s*

THE authors have produced a well-balanced and lucid account of the common types of tumour encountered within the thorax, bringing together much material which has appeared otherwise only in separate articles The clinical and radiological features are examined practically, and the surgical treatment well described It is inevitable that carcinoma of the lung should receive more attention than less common lesions, but the subject, illustrated by descriptions of cases, and handled as concisely as possible, is covered in 60 pages The chapters on dermoids and neurogenic tumours are good, but the section on adenoma loses through its brevity Since the nature of adenoma of the bronchus is still not finally determined, the views of Graham and Womack, even if they are not accepted, might have been discussed Tumours and enlargement of the thymus are not mentioned apart from a case-report The book is written essentially from a common-sense standpoint in the section on pleural endothelioma, for instance, a great deal of previous confusion is cleared The authors discuss the place of radiotherapy in malignant disease reasonably and without undue or extravagant claims, but at the same time they show how valuable this form of treatment can be with modern methods and proper selection The operative treatment of all forms of tumours is given fully yet without unnecessary detail, and the indications for surgery and for non-intervention are clearly defined The author of the section on radical excision for cancer of the lung is perhaps a little more conservative than some surgeons, but he gives reasons for his policy

Ugo Benzi

DEAN P LOCKWOOD, emeritus professor of Latin, Haverford College, U S A. Chicago University Press London Cambridge University Press 1951 Pp 441 60*s*

Ugo Benzi of Siena, known as the Prince of Philosophers and Physicians, flourished among the teeming life of the courts and universities of northern Italy in the first half of the 15th century His Life (*Vita Ugonis*), preserved in a Latin manuscript at Ferrara, was written about 1410 by his son Socino This highly-eulogistic account is claimed to be the earliest independent and authentic Life of a physician in existence We are told how Ugo, a philosopher, was advised at the age of 28 to study medicine "After attending lectures in the subject for only six months—a feat which he was able to accomplish because he had laid intellectual foundations which made the approach to every branch of medicine easy to him—he ceased lecturing in philosophy and began to teach medicine winning great acclaim by his public disputations" Ugo set the seal on his academic career by composing commentaries on the most important works of Hippocrates, Galen, and Avicenna He also left a record of case-notes in his *Consilia* Professor Lockwood, who examines these in detail, has produced an erudite work of great interest to anyone studying the period Much of the text is in Latin and more is bibliographic, but the Life and the case notes and the picture of medieval Italy make good reading

Annual Review of Microbiology

Vol 5 Editors CHARLES E CLIFTON, SIDNEY RAFFEL, H ALBERT BARKER. Stanford Annual Reviews Inc 1951 Pp 379 $6

EVEN if we except the viruses, it is no longer strictly true that microbiology and bacteriology are synonyms When the first edition of "Topley and Wilson" appeared in 1929, most of it was not only intelligible but interesting to the physician, but we doubt whether anyone who does not spend his days at the laboratory bench will read many pages of this Annual Review with much enlightenment Many of the articles deal with topics which—at present, at any rate—are far removed from the practice of medicine We shall all hear more, however, of the phenomenon of mutual interference between viruses, the subject of an illuminating discussion by Lennette, and many readers will be grateful for Melnick's comprehensive survey of the poliomyelitis-like *viruses of man and animals* Bisset *contributes* a fascinating account of bacterial morphology Few of the authors limit themselves to a bare summary of the work of others, and the general standard of contribution is high

Personality and Psychosis

OTHO W S FITZGERALD, M D, *medical superintendent of* Shenley Hospital London Baillière, Tindall, & Cox 1951 Pp 134 12*s* 6*d*

THOUGH it is always interesting to read the considered opinions of a clinical psychiatrist upon the problems of personality which he meets in his practice, it is unlikely that he will add anything material to the vast literature on the subject, unless, like Freud or Jung, he has a new method of approach. Dr Fitzgerald, however, relies on standard equipment and an essentially Jungian typology He has written an articulated essay, not a monograph, and those who disagree with what he says cannot dispute his evidence, for his deductions are based on clinical experience that is not communicated but *quoted only to exemplify the prepsychotic types* of personality he describes These case examples are well presented for their purpose, but do not make up for the omission of due systematic discussion of the shortcomings and problems of classification in this perennially absorbing field

Whitaker's Almanack 1952 (London Whitaker Pp 1156 + xxxii. 15*s*)—The general election came at an awkward time for this well known hardy annual The difficulty has been overcome by inserting a 30 page supplement on the general election at the front of the main body of this work, which otherwise is of the same size as it was last year Nevertheless space has been found for the inclusion of new features For instance, the municipal directory of England contains a new section showing the representation of political parties in borough and urban district councils. The price has been increased by 3*s*

Die Chirurgie der Schilddrüse (Berlin Walter de Gruyter 1951 Pp 88 D.M 12)—In this small book Dr Heinz Flörcken sums up his considerable experience of thyroid surgery It is mainly a personal record, and references to work at other centres are scanty His outlook is orthodox but old fashioned recent advances in thyroid *physiology* are barely mentioned, though *their impact on thyroid* surgery has been considerable The possibility that antithyroid drugs may have a use in the preparation of the toxic patient is dismissed in a brief footnote Such forthright conservatism has its attraction, but makes the book less useful than it might otherwise be The operative procedures are adequately illustrated by drawings.

THE LANCET

LONDON SATURDAY FEBRUARY 23, 1952

Deaf but not Dumb

"Society," wrote John Dewey the American philosopher, "is identical with communication" Certainly man's happiness and success in life are closely linked with his ability to communicate his ideas and argue his views with others the significance of this ability in the popular esteem is reflected in the usage of "dumb' to mean feather brained To the layman too, all deaf people are fools, he has no patience with them.

In training deaf children, then, the aim must be to enable all those of sound mentality to join freely, by speech and speech reading in conversation with their social and business associates On this standard the education of the general run of deaf children in this country is a failure The reason is not that the children are too dull to learn performance (non verbal) tests show that as a group they are well up to average intelligence, however defective they may appear to the uninitiated But if they are not properly trained, or their training is delayed too long, children born with severe degrees of deafness never learn to speak intelligibly and those who lose their hearing when 2–3 years old also lose their speech and never recover it Such children become intellectually retarded, not from any lack of grey matter but from its disuse and no subsequent training will recover the lost ground It follows that speech training should be started at the earliest possible moment by waiting six months for convalescence to be complete we may miss the one chance of building up the child's speech on existing foundations Yet at present facilities for speech training for children, starting at an age between 6 months and 3 years are almost entirely lacking outside the London area, and unless one has a clear understanding of how speech and auditory discrimination are developed in childhood it is hard to appreciate the urgency of the need

Auditory discrimination is the ability to recognise and appreciate the meaning of sounds, including their specialised forms that we call words—the most difficult sounds that the normal child is expected to learn to use and understand in others. Speech is made up of a series of pure tones varying in frequency and intensity (i.e. pitch and loudness) from moment to moment in definite 'speech patterns that are stored in the auditory memory Words are most easily understood at an intensity 50–60 decibels above the minimum level for audibility In ordinary speech some words are more difficult to hear than others because there is often a difference of 30 decibels between the loudest and softest word This difference is a result of the complex phonetic elements of which words are composed vowels are loud sounds of low pitch whereas consonants, without which speech is unintelligible are weak and high pitched It is in the higher frequencies, and therefore the consonants, that the hearing loss is usually greatest in children who are born deaf or who become deaf after meningitis The infant with normal hearing first learns to discriminate between one sound and another, he learns to locate them, and instead of starting reflexly at all sounds he soon begins to know which are important to him The next stage is the building up of a vocabulary of words and phrases on the basis of these familiar sounds It is during the first three years of life by constant and repeated listening that the child lays down the essential foundations of auditory discrimination thereafter he finds increasing difficulty in mastering new sounds The importance of this normal speech learning period has been stressed by Sweet, Gesell, and many other authorities In her letter on another page Miss Edith Whetnall, of the audiology unit set up as part of the Institute of Otology of London University makes a strong plea for the provision of speech training for all deaf children as soon as their deafness is diagnosed even though they are so young that the diagnosis can only be based on the mother's story plus rough tests of reactions to loud noises, and so may have to be revised later In her view, this early training would in the long run save the country's money, besides giving these children a far better chance of escaping a life of sign language

The multiplication of training centres that such a training programme would necessitate would mean a considerable expansion of the new specialty of audiology This covers all aspects of the arts and sciences that relate to hearing and it must therefore invade the territories of physics, phonetics psychology, and otology as well as that of education The team will need members or at least advisers from all these related sciences but they must also coöpt the parents of the children they are to train For too long the father and mother of a deaf child have been looked on as ex-officio impediments to his progress and their observations have been automatically disregarded Intelligent parents usually find out that their child is deaf long before his first birthday but often their fears are pooh poohed by their doctor if they seek his advice, and until lately a second opinion has been of little use since most otologists have adhered to the view that partial deafness cannot be certainly diagnosed before the age of 3 years The normal child learns to speak and to understand speech from its parents the deaf child will do the same, provided that the parents are encouraged by their own doctor and receive skilled guidance from the audiologists This is no new doctrine I conceive there might be successful addresses made to a dumb child, even in its cradle' wrote Dalgarno in 1680 and in 1911 Kerr Love was urging that with the young deaf child its mother should be its first teacher

The translation of principle into practice has largely been worked out in Manchester by the Ewings and in the U.S.A. at the John Tracy Clinic The basis of the modern techniques is to teach the child through his eyes and hands what he cannot learn through his ears, and in the small proportion of deaf children whose hearing loss is total or almost so the methods devised have all depended on the visual and tactile senses But most deaf-born children possess a useful residue of hearing, and for them the modern hearing-aid has opened up the far greater potential benefits obtainable by auditory training in addition to visual and tactile As **Max Goldstein** points out, the auditory techniques call for teachers understanding the elements of music, acoustics, aural physiology, and phonetics Then—just as a normal child would not be expected to learn to speak by listening to speech for a few half-hours a week, and still less if he never heard a word spoken until he was 3 years old—so the child with slight residual hearing should use his aid continuously, to gather at least as much listening experience as the hearing child There is no sense in postponing the fitting of a hearing-aid, as is often advised, simply on the grounds that the child is too young Modern aids can be tiny enough to fit a baby with an aid, even though it has to be changed later; and, as Miss **Whetnall** remarks, the country will save money in the long run by providing aids for all children likely to benefit from them and training the mothers to teach the children to use them The alternative is education in special schools, which is always expensive, whereas a large proportion of deaf-born children can be trained and then sent to an ordinary school The same applies to school-children who are made deaf by meningitis (sometimes by the drug that saved their lives) or infections of the ear itself If their training in the early years is taken seriously, many of them will learn to speak as well and as soon as the hearing child, and will hold their own with the others when they go to an ordinary school Adaptations of all kinds come easier in childhood than in adolescence, and the plunge into a hearing world is less of a shock at 6 years than at school-leaving age If the social and emotional development of a deaf child is to be normal it must mix freely with normally hearing children Isolation from normal people produces eccentricities of personality that will handicap the child through life Deafness is enough of a burden without that

Meningitis in Mumps

Mumps, because it blows up the countenance and bears a ridiculous name, has acquired a comic reputation, but in fact it is not in the least funny During the last ten years the methods of the virus laboratory have been used in its study, and have helped to confirm the view[1] that it is a general infection of which parotitis is the most common, though not an essential, clinical manifestation Other manifestations include meningo encephalitis, orchitis, and pancreatitis, but until laboratory confirmation was possible the origin of such manifestations could only be recognised if they developed in families or institutions where typical mumps was already present

In this issue Dr **Henderson** describes an outbreak of mumps in a boys' preparatory school The central nervous system was affected in no less than 11 of the 14 patients Of these 11, 4 presented with meningitis and did not show parotitis or orchitis at any stage In another case the illness started as meningitis, but parotitis developed next day In the cases where parotitis appeared first, the symptoms of meningitis developed 4–12 days later, the onset of such symptoms was sudden, and they lasted 2–7 days The cerebrospinal fluid (C S F) usually showed a lymphocytic pleocytosis, but it was normal in 2 cases with clinical signs of meningitis The picture was that of "benign lymphocytic" or "aseptic" meningitis Laboratory tests supported the view that the mumps virus was the cause of the meningitis in those cases where parotitis did not develop

The virus of mumps was isolated in 1934 by **Johnson** and **Goodpasture**,[2] who inoculated filtered saliva from patients with mumps into the parotid ducts of monkeys, thereby producing parotitis They passed the virus through a series of monkeys by inoculation with suspensions of infected parotid glands removed at the height of the disease, and showed that convalescent animals were immune to reinoculation This led **Enders** and **Cohen**[3] to develop the mumps complement-fixation test, using as antigen a suspension of parotid glands from infected monkeys Investigation of sera from patients in the acute and convalescent stages of mumps showed a rise in complement-fixing antibody[4] **Kane** and **Enders**[5] used this test to determine the ætiology in 51 cases of acute aseptic meningo encephalitis and in 16 they found evidence of recent infection with the virus of mumps, though parotitis had been absent This incidence (29%) may have been high because most of the patients were children, and because the series was to some extent selected In an unselected series of 374 soldiers who developed acute aseptic meningitis without parotitis in various parts of the United States during 1941–46, complement-fixation tests indicated that mumps was the cause in 15%[6] In Sweden **Alm**[7] found a rise in mumps antibody titre during convalescence in 8% of 76 cases In these investigations the proportion of patients whose illnesses were attributed to the mumps virus varied considerably—probably with the age of the group, and the presence or absence of mumps in the community Certainly mumps virus is one of the commonest causes of aseptic meningitis, but the ætiology of most other cases remains unknown

Mumps virus has been isolated from the C S F of a case of meningo encephalitis by infection of the developing chick embryo[8] The usual laboratory diagnostic methods are serological, and of these the complement-fixation test is usually preferred to the hæmagglutination-inhibition test A more convenient source of antigen than the parotid of the infected monkey was obtained by adapting the mumps virus to the developing chick-embryo **Henle** et al[9] found that such material contained two distinct antigens—S (soluble) and V (virus)—and that corresponding antibodies appeared in convalescent sera from cases of mumps Detection of these antibodies enabled the diagnosis to be made 2–8 days after the onset in 8 out of 12 cases of mumps meningo encephalitis in which parotitis was absent **Henle** et al. hold that high titres of S antibodies and low titres of V antibodies in the serum are of diagnostic significance in the first few days of the illness, high titres of both antibodies indicate a recent or a current attack of some days' duration. In diagnosis a fourfold rise in titre should if possible be demonstrated and serum should therefore be obtained early in the illness and again 1–3 weeks later. MacCallum[10] has named the titres that he regards as of diagnostic significance and has discussed the interpretation of an unchanging titre. (Titres vary with the technique of the particular laboratory.) The mumps complement-fixation test is of value in the difficult differential diagnosis from non-paralytic poliomyelitis.[11] Other serological tests which aid in the diagnosis of cases of lymphocytic meningitis are the complement-fixation test for the virus of lymphocytic choriomeningitis[12] and the agglutination tests for leptospiral infections.[13]

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[1] Gordon, J E Heeren R H *Amer J med Sci* 1940, 200, 412

[2] Johnson C D, Goodpasture, E W *J exp Med* 1934, 59, 1

[3] Enders J F, Cohen, S *Proc Soc exp Biol, N Y* 1942 50, 180

[4] Enders J F *Harvey Lect* 1947, ser 43, p 92

[5] Kane, L W Enders, J F *J exp Med* 1945 81 137

[6] Rasmussen, A F Rocky Mountain Conference on Poliomyelitis Denver Colorado 1946

[7] Alm L *Acta med scand* 1951, suppl 203

[8] Henle, G McDougall C L *Proc Soc exp Biol, N Y* 1947, 66 209

[9] Henle, G, Harris, S, Henle, W *J exp Med* 1948, 88, 133

It is not easy to discover from published work the frequency of meningo-encephalitis as a manifestation of mumps. Dr Henderson quotes reports according to which the nervous system was affected in up to 65% of cases. In some this had been detected clinically, in others the C.S.F. had been routinely examined for the presence of lymphocytic pleocytosis. Alm[7] consolidated the results of six investigations in which 601 cases of mumps were specially examined clinically for manifest meningitis and by lumbar puncture for latent meningitis. Manifest meningitis appeared in 25% of cases, and C.S.F. examination revealed latent meningitis in another 30%. Thus the central nervous system was found to be involved in altogether 55% of cases.

Alastrim Again?

In this country the last big outbreak of variola minor or alastrim ended in 1934, and now it appears to be with us again. As will be seen from the note on p. 425, the disease has been first recognised not in the ports but in an area which uses raw materials from parts of the world where alastrim smoulders persistently. Though guesses at the source of the infection may seem premature it is important to consider the possibility that the disease has been with us for some time or, on the other hand, that a missed case may recently have slipped the cordon sanitaire. Apparently, practitioners in certain parts of Lancashire have seen cases thought to be atypical varicella, and the newspapers have also mentioned unusual outbreaks of chickenpox in adults. Some of these may have been cases of alastrim though this is only speculation. Alastrim is a mild but highly infectious disease and as these attributes favour rapid spread we should be on guard against a repetition of the 1928–34 epidemic.

In an outbreak, or where a virus laboratory is at hand, it is easy to confirm a diagnosis of alastrim. Clinically the sporadic case may cause difficulty but there are several features that distinguish it from the other exanthems. In a valuable analysis of 13 686 cases in London, Pickford Marsden[1] notes that the early symptoms are a sudden rise of temperature, headache, backache, shivering, pains in the limbs and sore throat. These symptoms follow an incubation period which is usually about 12 days, and 3–4 days later the rash comes out and the temperature drops. This is quite a different sequence from that of most cases of chickenpox, in which the rash precedes or coincides with the onset of symptoms. In Marsden's cases the protean symptoms of the pre-eruptive fever often led to a diagnosis of influenza, pneumonia, or appendicitis, and sometimes the relation between this illness and the subsequent rash was not suspected. The rash may come to resemble a simple pyogenic infection, but it begins as a pinhead papule, often with a surrounding areola, and this is followed by rather transient vesicles which are later invaded with polymorphs. The size of the lesions varies considerably but there are almost always a few with a rounded outline and dome-shaped summit. As in smallpox, the distribution is centrifugal, and the trachea, palms of the hands, and soles of the feet may be involved. In chickenpox the maturation of the rash is more rapid than in alastrim, and lesions occur more often on the less exposed parts. Alastrim, unlike chickenpox, does not show crops occurring at all stages, but, as Butterworth[2] points out, it is the distribution of the rash which is of most value in distinguishing the two conditions. The mortality from alastrim in over 350,000 cases in the U.S.A. during 1921–30 was 0·9% while in the London series of 1928–34 it was 0·25%.

The relationship of the various members of the pox group of viruses has been extensively studied by A. W. Downie and his colleagues in Liverpool, but there seems to be no laboratory method of differentiating alastrim and variola viruses. On the other hand, though the two probably derive from a common ancestor, they now breed true and there is little reason to fear that alastrim patients will cause smallpox in contacts. In this respect alastrim differs radically from mild or modified smallpox from which it may be clinically indistinguishable, for mild or modified smallpox is nowadays the usual source of highly virulent infections among contacts. Because of the sharing of antigens among the pox group, recent vaccination with vaccinia virus gives protection both against alastrim and against smallpox, and a previous attack of either disease may modify or prevent the other. With the decline in the number of vaccinated people in this country it may well be that alastrim will find easier channels of spread than in 1928–34. Marsden records that 1083 of his total of 13 686 cases of alastrim had in fact been vaccinated after exposure, but most of these had had their inoculations later than the 7th day after contact when no protective effect could be expected. The precautions taken by the authorities to minimise the spread of the present outbreak will have general approval, but a point can be reached at which the advantage of isolating contacts, or of undertaking mass vaccination, becomes doubtful. Fortunately the disease is mild, and, though there are no specific methods of treatment, the septic complications which were fairly common in the last outbreak should not trouble us unduly in this.

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10. MacCallum, F. O. *Mon. Bull. Min. Hlth P.H.L.S.* 1951, 10, 207.
11. Kilham, L., Levens, J., Enders, J. F. *J. Amer. med. Ass.* 1949, 140, 934.
12. MacCallum, F. O. *Mon. Bull. Min. Hlth P.H.L.S.* 1949, 8, 177.
13. Broom, J. C., Robertson, K. M. *In* Modern Practice in Infectious Fevers. Ed. H. S. Banks. London, 1951, vol. 2, p. 827.

1. Marsden, J. P. *Bull. Hyg., Lond.* 1948, 23, 735.
2. Butterworth, J. J. Control of Common Fevers. London 1942.

Annotations

BARBITURATES ON THE BRAIN

THE importance of the barbiturate group of drugs as a cause of poisoning is well known, and we have drawn attention to the increasing number of deaths from this cause [1] Not so well recognised are the occasional ill effects of taking these drugs over long periods

The latest warning comes from the U S A, where the use of barbiturates without due medical supervision is said to be increasing Dr Victor H Vogel,[2] who is in medical charge of the Federal Narcotics Hospital at Lexington, Kentucky, has said that "sleeping-pill addiction" is becoming a more serious problem than morphine and heroin addiction, because barbiturates are so easy to come by, and their sudden withdrawal can cause severe symptoms He suggested, however, that therapeutic doses continued for an indefinite time would not cause addiction Dr Herbert Weider,[2] of Bellevue Hospital, New York, has remarked that addiction to barbiturates is more dangerous to the rest of the community than morphine addiction, for the barbiturate taker may become aggressive and uninhibited in his antisocial drives That barbiturates are being used excessively by some Americans is obvious from the 1948 production figure (672,000 lb)—which works out at 24 pills a year for every citizen of the country.

In 1927 [3] and again in 1933 [4] Sir William Willcox warned us against the use of these drugs He claimed that repeated therapeutic doses could cause such disturbances as mental depression, drowsiness, visual hallucinations, vertigo, ataxia, slurring of speech, diplopia, squint, nystagmus, and muscular paralyses, and he reported two cases which had been referred to him as undoubted instances of organic nervous disease, whereas in fact these patients were suffering from chronic barbiturate intoxication He also maintained that the barbiturates could give rise to addiction In the subsequent correspondence, termed the Battle of the Barbiturates, Willcox was supported by Sir James Purves Stewart,[5] who reaffirmed the danger of addiction and described syndromes of mesencephalic, cerebellar, and spinal paralyses resulting from therapeutic doses Most of the correspondents, however, including Gillespie,[6] held that the dangers were much exaggerated, and doubted whether true addiction ever occurred

Nowadays drugs are usually classified as addiction-producing [7] only if they give rise to an abstinence syndrome German workers described convulsions and delirium after withdrawal of barbiturates, and Isbell's [8] later experimental work was held by a W H O expert committee to prove that "chronic barbiturate intoxication resulted in the development of tolerance and dependence, as manifested by a characteristic abstinence syndrome," and that therefore the barbiturates could produce addiction

In this country the public may not freely purchase these drugs, which are on the list of schedule-4 poisons, but there is some evidence that doctors are sometimes too prone to employ them indefinitely as placebos Dunlop et al [9] report that of over 17,000 prescriptions under the National Health Service in September, 1949, 9 4% were for barbiturates Commonly such prescriptions are for large quantities, and, whatever the cause, this easy-going practice is apt to lead to dependence and addiction It is noteworthy that the W H O Expert Committee on Drugs Liable to Produce Addiction, at a meeting in Geneva last month, recommended that national measures to control the distribution of these substances should be strengthened.

BESNIER'S PRURIGO

Ernest Besnier invented the word "biopsy," but grateful posterity links his name with that of the syndrome which he called "prurigo diathésique"—though this distressing symptom complex is also known by at least six synonyms Besnier emphasised the existence of a strong inherited predisposition to the disorder, and the clarification of ideas on allergy has yielded nothing more precise It appears that in this disease group a proneness to sensitisation is inherited, but not any specific hypersensitivity Rost [1] called this hereditary trait the "status exudativus," and Coca [2] described it as a cardinal feature of "atopy" Doubt has been cast on most of Coca's distinctions between atopy in man and animal anaphylaxis, but the only practicable means we have for detecting the atopic group are skin tests, either direct or by passive transfer The apparent simplicity of such tests is perhaps unfortunate, for the erroneous reading of wholesale tests of this sort and treatment based on them has brought discredit to the allergist

A new study [3] of allergic symptom-complexes in children, based largely on the results of skin tests, purports to show that in infantile eczema the skin is sensitive to foods, in an older age-group respiratory symptoms may develop, with or without positive reactions on skin testing with inhalants, in a third stage skin and respiratory symptoms are accompanied by positive skin tests to inhalants Unfortunately the clinical relevance of the skin tests is not clear, Rost [4] says, "no particular conclusions are to be drawn from the altered capacity of the skin to react to intracutaneous injections" In general, whatever the results of skin tests in Besnier's prurigo, specific desensitisation hardly ever helps The prognosis, however, is by no means as gloomy as this might suggest, since the condition usually improves despite the persistence of the allergic mechanism The tendency for the skin changes to affect the flexures led Wiseman [5] to make skin tests at various sites, using allergens in hypersensitive subjects and histamine in normals He obtained larger weals in the antecubital and popliteal areas than elsewhere, which suggested local variations in the response Others [6] have shown another peculiarity of these sites in cases of Besnier's prurigo—namely, increased sweating on the inhalation of allergens

Many share the opinion of Stokes [7] that children in this group are "ceaselessly active, precocious, assertive, egocentric to a degree obtrusive even for this egocentric age" For many years it has been thought that commonly patients with chronic pruritus gained sexual satisfaction through scratching (Jacquet's *onanisme cutané*) Kepecs et al [8] minimise the importance of "erotization" of the skin in Besnier's prurigo, recognising nevertheless that heterosexual conflicts underlie many of the difficulties experienced by these patients These workers found two types of patient in their series One was emotionally labile and prone to weeping Emotional situations in which tears were repressed were associated with bouts of itching and scratching, interpreted by Kepecs et al

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[1] Leading article *Lancet* 1951 ii 297
[2] *New York Times* Dec 16, 1951
[3] Willcox W *Ibid*, 1927 i 1037
[4] Willcox W *Ibid* 1933 ii 1425
[5] Purves Stewart, J *Ibid* 1934 i 424
[6] Gillespie R D *Ibid*, p 337
[7] W H O Technical Report Series no 21 Geneva, 1950, pp 9 13
[8] Isbell H Altschul S, Kornetsky C H Eisenman A J, Flanary H G Fraser H F *Arch Neurol Psychiat* 1950, 64 1 See annotation *Lancet* 1950 i 822
[9] Dunlop D M, Henderson, T L Inch R S *Brit med J* Feb 9 1952 p 292

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[1] Rost G A *Dtsch med Wschr* 1930 56, 211
[2] Coca A F *Arch Path* 1926 1 96
[3] Ratner B, Collins Williams, C Untracht, S *Amer J Dis Child* 1951 82 666
[4] Rost, G A Allergie und Praxis Berlin, 1950
[5] Wiseman R D *J Allergy* 1951 22 541
[6] Tuft L Tuft, H, Heck M *J invest Derm* 1950 15, 333
[7] Stokes J H *Psychosom Med* 1940, 2 438
[8] Kepecs, J G Robin A, Robin M. *Ibid*, 1951, 13, 1

as ' masochistic and self destructive ' This group was subject to chronic disorder of the skin The second group were rigid, tense individuals who appeared to be more successful in their management of hostile situations, including sexual contacts Their skin trouble was more intermittent than that of the first group The mechanism of psychogenically induced skin eruptions is suggested by an investigation in which blisters were raised by means of cantharides.[9] The roofs of the blisters were removed and the rate of exudation measured at intervals Under hypnosis and in emotionally charged situations produced by suggestion the rate of exudation and the repression of emotion were found to be correlated

Conceivably Besnier's prurigo is initially a disease of hypersensitivity to ingested or inhaled substances, complicated by non-specific factors such as changes in temperature, friction of clothes, scratching, and the hazards of treatment. The sites of predilection may be determined by local physical and physiological factors. Later, the process may be maintained by purely emotional events, the site of expression being determined by specific psychological factors or the " organ inferiority " of the previously diseased skin

FRONTAL LOBES OF THE HUMAN BRAIN

In relation to the obvious mental or physical deficit which results a larger proportion of the prefrontal lobes can be removed than of any other region of the brain This of course, does not mean that the frontal lobes are unimportant but rather that the mechanisms with which they are concerned, though at first sight inconspicuous, are so intricate that a great region of brain is required for their operation The introduction by Moniz in 1935 of operations on the frontal lobes for the relief of psychosis has aroused widespread attention. Undoubtedly, severe and long-continued psychosis has often been wonderfully improved by a frontal lobe operation; and in many such cases the state of the patient is otherwise so miserable and hopeless that few would question the wisdom of operating When, however the operation is advised for relatively benign states of psychoneurosis, or for the relief of pain, it becomes necessary to examine very critically the balance between gain and loss.

In a recent lecture Prof. J F Fulton[10] expressed considerable enthusiasm for psychosurgery directed towards the frontal lobes, but insisted that the operation should generally be limited to section of fibre-tracts running to the medial ventral quadrants. If the operation were more widely used in the modified form which I have described I have no doubt that the schizophrenic population of our mental institutions could be reduced by at least fifty per cent.' The operation he advises aims at dividing connections of the visceral brain with the hypothalamus This operation also, for reasons not understood, gives great relief from intractable pain

It remains to be seen however whether Dr Fulton s hopes for this operation will be fulfilled in practice. The operation if successful presumably removes the emotional feeling which tortures the anxious and obsessed, and which also apparently plays a large part in the suffering caused by chronic pain But the ' cured patient is likely to be emotionally blunted and may become friendless. The finer human relationships depend on a delicate balance of feeling which cannot survive the tactless remark, the thoughtless act or the failure to show understanding When are we therefore ethically justified in advising a procedure which though it relieves the misery of neurosis or of pain will also dull the patient s sense of responsibility conscience and feeling for others? If some may be resistant to ethical doubts they should at least consider how best to ascertain whether a patient after leucotomy is fit to care for his financial affairs or to drive a motor car safely Finally, we must not suppose that anatomically we all use the brain in the same way for it is evident that in different people identical brain lesions may produce widely differing intellectual consequences.

MATING IN MAN AND ANIMALS

One of the chief gifts of the nineteenth century to medical thought was the freedom it gave us to consider man biologically—to see how in common with other living things, he had come from small and simple beginnings. This change of approach proved nothing either way about the nature of man But the assumptions made, and the controversy which burned, then have left some subjects so hot with emotion that we are still obliged to handle them with caution Sexual behaviour is such a subject it radiates not only the heat acquired in the nineteenth century but all that generated in the course of man s cultural and emotional development. Yet comparative studies of mating behaviour are badly needed if we are to recognise and understand its variants Psycho-analysis is concerned to uncover the forces which lead to a shift of emphasis in this behaviour and cause it to deviate from the mean Unfortunately in the early days, psycho-analysts made a fairly sharp distinction, which has been perpetuated, between 'normal' and abnormal ' patterns. Pathological states in general are built up from a complex of normal and functionally useful processes acting under abnormal stimuli; and it is not surprising to find psychological disorders following the same pattern As far as sexual deviations are concerned the evidence from zoology suggests strongly that residues of basic mammalian mating patterns may persist; and these have acquired in man, important psychological and symbolic overtones

Ford and Beach[1] have correlated a very large body of information about the patterns of sexual behaviour in animals, in primitive ' societies, and in urban man of the present day Their book presents a continuous sequence extending through zoology and anthropology to clinical psychiatry Any detailed sifting of psycho analytical hypotheses in the light of this mass of evidence is rather wisely left to the reader The main forms of sexual outlet the patterns of mate-selection and sexual partnership the physiology and psychology of development and the influence of cyclical hormone mechanisms are fully documented The book contains the results of Beach s painstaking work on primates, together with a vast amount of other data—less adequate in the anthropological field perhaps, than in the zoological but all of it relevant.

The distribution-curve of almost all possible forms of sex behaviour tends in man to form a flattish peak which even intense cultural and social pressures can seldom sharpen very much. Humans are capable potentially of the full range of mammalian sexual behaviour and if they renounce any part of it in pursuit of higher satisfactions they can in the light of modern knowledge, do so with full and rational insights to guide them The psycho analyst is apt to distrust the comparative approach on the grounds that it can lead to facile judgments about deep-rooted processes there are people about who are capable of arguing that because the male mink conquers the female in a violent fight, sadism is normal The risk of any such Nietzschean oversimplifications, however is not great among serious biologists. Sadism in the analyst s sense is not normal to man either clinically or statistically, nor is it inherent. What is inherent is at most a strand of the mammalian mating-pattern which, given certain adverse stimuli, individual or cultural or both, may be activated to provide a symptom The same probably applies to other troublesome deviations

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[9] Kepecs, J G Robin, M. Brunner M *Ibid*, p 10.
[10] Fulton, J F Sterling professor of the history of medicine, Yale University Sherrington Lectures II: The Frontal Lobes and Human Behaviour Liverpool University Press 1952 Pp 23 1s 6d

[1] Ford C S, Beach, F A. Patterns of Sexual Behaviour London: Eyre & Spottiswoode 1952 Pp 307 27s 6d.

It is a pity, in the interests of completeness, that Ford and Beach confine their anthropological data to modern America and to relatively small and closed societies of homogeneous structure The important analogies which we need to be able to draw, in psychiatric practice, depend on an extension of these studies to other urban cultures For this omission the authors apologise unnecessarily, for they have laid some much-needed foundations for future work in comparative psychology, and for the verification of current psychoanalytic hypotheses

ANTI-HISTAMINE DRUGS AND AURICULAR FIBRILLATION

IN 1946 Dawes[1] described an ingenious method of measuring the contraction-rate of isolated auricles, and he showed that local anæsthetics, analgesics, and spasmolytics all had some of the properties of quinidine Dews and Graham[2] later found that 'Neoantergan' (pyranisamine maleate), an anti-histamine preparation, acted on the auricle twice as strongly as quinidine, and similar findings have been described in respect of other anti-histamine substances[3–5] Orias et al[5] found by electrocardiographic examination that the changes evoked by administration of these substances included auriculoventricular block, bradycardia, and a shift in the electrical axis Levitan and Scott[6] found in dogs with ventricular arrhythmias, produced by ligation of the circumflex branch of the left coronary artery, that 'Pyribenzamine' (tripelennamine hydrochloride) and 'Benadryl' (diphenhydramine hydrochloride) temporarily subdued the myocardial irritability and occasionally suppressed extrasystoles, but had no effect on the mortality-rate after 24 hours White and McCawley[7] reported that in dogs multiple ventricular extrasystoles and ventricular tachycardia caused by means of cyclopropane and adrenaline were prevented by diphenhydramine, and this drug has been shown by McCawley et al,[8] using Dawes's technique, to prolong the refractory period at concentrations below that required for quinidine Both quinidine and diphenhydramine also controlled the fibrillation produced in the isolated auricle by a localised traumatic infarct or by aconite These workers concluded that diphenhydramine should be tried in patients with auricular fibrillation—a use which had already been suggested for the anti-histamine drugs in general by Burn[9] and DiPalma and Schulz[10]

Dick and McCawley[11] have now administered diphenhydramine intravenously to 12 patients with auricular fibrillation In 6 of these the drug restored normal sinus rhythm, in 2 it was ineffective and the desired result was obtained by giving large doses of quinidine by mouth, and in the remaining 4 the fibrillation persisted despite the administration of both drugs Side-effects from diphenhydramine included drowsiness, vertigo, haziness of vision, and frontal headache Fuller trials may prove that anti histamines are a valuable adjunct in the control of cardiac arrhythmias

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1 Dawes, G S *Brit J Pharmacol* 1946, 1 90
2 Dews P B, Graham J D P *Ibid* p 278
3 Reuse J *Ibid* 1948 3 174
4 Dutta N K *Ibid* 1949 4 281
5 Orias O, Gilbert, J L Brooks, C M. *J Pharmacol* 1949, 97 492
6 Levitan, B A Scott H J *Canad med Ass J* 1949 61 303
7 White J M McCawley, E L *J Pharmacol* 1950 98, 35
8 McCawley E L, Weston, G A David N A *Ibid*, 1951, 102 250
9 Burn, J H *Brit med J* 1950, ii 691
10 DiPalma J R Schulz J E *Medicine Balt* 1950, 29 123
11 Dick H L H, McCawley E L *Amer J Med* 1951, 11, 625

RATE OF PASSAGE THROUGH THE INTESTINE

THE intrinsic movements of the small intestine are of two kinds (1) the swaying or pendulum movements which churn the food into closer association with the digestive juices and bring dissolved digestive products into contact with the cells of the villi where they are absorbed, and (2) the peristaltic or rush movements which pass the food downwards These peristaltic movements in their simplest form accord with the law of the intestine stated by Bayliss and Starling they consist in a wave of contraction preceded by a short wave of relaxation, controlled by a myoneural reflex carried by nerves in the wall of the intestine In the intact animal and in man intestinal movements can be shown, by means of balloons in the intestinal lumen, to have essentially the same pattern, but the picture is influenced by the consistence and quality of the food, by circulating hormones, and by the extrinsic nervous system

Mann[1] and his co workers have for some years been making observations on dogs in which a loop of small intestine is exteriorised and covered with a tube of skin, so that the loop is in continuity and has an intact mesenteric blood and nerve supply The activity of the loop thus isolated has been recorded by a double tambour air-displacement apparatus The rhythmic segmentation has proved very constant for each specific loop, and the further the loop is from the pylorus, the slower is the rate of segmentation This intrinsic rate is not sensibly affected by sleep or by section of the sympathetic and parasympathetic nerves or operative procedures on other abdominal organs Activity fades, however, after 24 hours of fasting In the normal animal increase in intestinal movements follows ingestion of food, especially solid food. Peritoneal irritation and sudden distension of the urinary bladder cause inhibition of the movements, but these seem to be unaffected by distension of the gall-bladder Morphine causes a transitory increase of intestinal activity, followed by depression Spinal anæsthesia evokes increased intestinal activity, but other forms of anæsthesia were found to have either a depressing effect or no effect on tone and motility

The propulsive movements of the small intestine are less easily studied Observations on the passage of food and other substances taken by mouth and appearing through an ileostomy fistula are necessarily unreliable, so is timing the appearance in the stools of coloured matter taken by mouth, since evacuation of material from the lower colon may be delayed. Radiology has provided no satisfactory answer, since the transit of the opaque meal through the small intestine is normally so rapid that it is impossible to observe what happens With the ordinary barium meal, which is semi-fluid, the material begins to leave the stomach almost immediately after it has been swallowed, it moves fairly rapidly through the duodenum and very quickly through the jejunum and upper ileum, and in these parts the fragmentation of the food is so fine that it is not seen as a definite shadow on the screen but as a cloudy opacity[2] As the lower ileum is approached passage slows, and before the meal reaches the ileocæcal junction shadows of opaque food begin to collect and the intestinal movements become more or less inert Barclay concluded that, under the most normal conditions obtainable, the first part of the food reached the cæcum in $1^1/_2$–2 hours The normal limit for fairly complete evacuation of the small intestine seems to range from 8 to 15 hours The previous condition of the patient and preparation with aperients have considerable influence, and transit through the small intestine depends on the time and rate of gastric evacuation Cannon[3] showed that carbohydrate passes more rapidly through the small intestine

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1 Mann, F C *Surg Clin N Amer* 1943 23, 1111
2 Barclay A E. Digestive Tract A Radiological Study London, 1936
3 Cannon, W B *Amer J Physiol* 1906, 17, 429

than protein or fat. He also found in dogs that section of the vagus and sympathetic nerves to the small intestine had little permanent effect on the rate of passage of a meal through it—a finding which examinees and radiologists dealing with apprehensive patients, would not confirm. Gregory[4] found in dogs that feeding causes a sustained increase in intestinal tone and motility resulting in retardation of the fluid flow through isolated loops of small intestine, and that nausea from minimal doses of apomorphine is associated with similar changes

Transit-time through the small intestine has now been investigated by Lönnerblad[5] in normal infants aged about 1 year, school-children aged 9–10 years, and young adults aged 18–25 years The radio-opaque material was barium sulphate mixed with distilled water in the proportion of 1 : 2 by weight, and nothing was added except a small amount of sodium saccharin for infants and children Thus the material differed from the proprietary substances employed by practising radiologists. The stabilising substances incorporated in these produce an emulsion that may give different pictures, Frazer and his co workers[6] showed that patterns of the striæ of the small intestine may be quite abnormal' when fatty acids or hypertonic solutions are added to the barium suspension and that flocculation readily occurs in the presence of mucus. In general a small amount of the contrast material takes longer to pass through the small intestine than a large amount Lönnerblad found that from the time of ingestion the material passed through the small intestine in $1\frac{1}{2}$–6 hours (mean $2\frac{3}{4}$ hours) in the 1 year-olds, $\frac{1}{2}$–8 hours (mean $2\frac{1}{2}$ hours) in the 9–10 year-olds, and $\frac{1}{2}$–9 hours (mean about 3 hours) in the young adults.

BENIGN NEUROTROPIC INFECTIONS

SINCE the beginning of 1950 the paralytic and non paralytic forms of poliomyelitis have been notifiable separately There is no uncertainty about the meaning of the figures for paralytic poliomyelitis but it would be wrong to assume that the notifications of non paralytic poliomyelitis truly indicate the incidence of this form of the disease. Cases notified under this heading include illnesses among the contacts of paralytic poliomyelitis, other suspicious illnesses during the poliomyelitis season, and an assortment of different conditions the nature of which is uncertain

Dr David Thomson of the Ministry of Health threw a glimmer of light on this obscure matter when he addressed the section of epidemiology of the Royal Society of Medicine on Feb 15 In 1950 about 30% of the poliomyelitis notifications were of the non paralytic form and this proportion remained fairly constant week by week in different parts of the country In 1951 a similar distribution between the paralytic and non paralytic forms was found both in the early months and in the latter part of the year but between the 24th and the 37th weeks the proportions were inverted, the non paralytic cases (53% of the total) outstripping the paralytic. Inquiries in the Midlands, where this phenomenon was most manifest, revealed that the cases classified as non paralytic presented a fairly constant clinical picture, the outstanding features being sudden onset of severe frontal headache with pyrexia for three days or more and vomiting in about half the cases The physical signs included rigidity of the neck, and fairly commonly a positive Kernig's sign and photophobia In the cerebrospinal fluid there was a moderate pleocytosis (mostly lymphocytes) with increased protein and normal sugar and chlorides. Often cases were connected with each other In a number of areas this syndrome was prevalent in the absence of paralytic poliomyelitis. Later, similar outbreaks were experienced in the north of England and in the southern counties During September another outbreak of a hundred cases in the Forest of Dean was brought to official notice by a sudden rise in the notifications of encephalitis. The pattern of the illness was the same as that found elsewhere earlier in the year Family outbreaks were noticed in one family five children became ill on the same day No case of paralytic poliomyelitis was notified in the Forest of Dean during the whole of 1951

The age-distribution of these benign neurotropic infections was roughly similar to that of poliomyelitis In none of the outbreaks was there any convincing evidence that the disease might be associated with insect vectors. Dr Thomson gave reasons for supposing that the condition was not poliomyelitis encephalitis lymphocytic choriomeningitis, or Bornholm disease The relation of the Coxsackie group of viruses to outbreaks of this nature is still undecided. Dr Thomson pointed out, however, that this acute benign neurotropic infection is apparently not new A similar mild disorder was reported during 1930 from Lowestoft Sunderland, and Glasgow; and F G Crookshank described it as prevalent in 1917

SCHOOL ABSENCE

THE young assistant school medical officer has always been advised to study the class register in any school that he visited for in this register are written the failures and successes of preventive and curative medicine Unfortunately as no-one can see more than a small corner for himself, it has never been easy to appreciate the whole significance of the records available and the account[1] of the investigation which Mr E R Bransby PH.D, made during the three terms of the school year 1947–48 is therefore of particular value and interest The inquiry included two urban areas, Birmingham and Sheffield, and two rural areas in Kesteven (Lincolnshire) and Worcestershire. In the towns he observed districts of four kinds—slum working class, new housing estate and residential The reasons given for absence were associated with parental interest, social class, meals in schools and the type of neighbourhood though they revealed a great deal, they also suggested that the reasons for preventable' absence are subtle and not likely to be easily reduced Out of the ten years most children spend at school they will be absent for the equivalent of a whole year—a sobering thought. On the other hand as Dr Bransby shows, the children of mothers who go to work are less often absent than others and that calls to mind those five year-olds with acute upper respiratory infection left at the infants school at 9 30 A M when they ought to be in bed. As he says, the difficulty is to decide whether children are too often or too seldom absent through illness.

It is interesting that the behaviour of a neighbourhood—which may in part reflect the policy of the education authority the school and the school welfare (attendance) officers—is of more importance than the difference between social classes Experience shows that behind the case of frequent absence for apparently trivial reasons medical or non medical there is often a social or psychological problem which needs attention Not every child is yet fortunate enough to be born into a family who take an intelligent interest in his progress but every doctor can help parents to recognise the child's true interests, and to hold a balance between unnecessary absence hidden behind a medical label and attendance when he would be better at home Dr Bransby's paper is important not because it reveals any unsuspected knot of illness in school children, but because he shows that there are such wide variations in what is too often regarded as an irreducible minimum of absenteeism

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Special Articles

INJECTION ROUTINE IN OPERATING-THEATRES

PRESENT PRACTICE AND SUGGESTED CHANGES

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It is recognised that from time to time every large hospital has to record an unfortunate accident In the stress of the moment, the wrong solution has been injected subcutaneously or intravenously, sometimes with a fatal outcome

In order to investigate the use of both injectable and non-injectable fluids in operating theatres, and to suggest means which might reduce the risk of error, we visited 45 hospitals in England and Wales, of which 19 were teaching hospitals At each hospital an anæsthetist, theatre sister, and pharmacist were interviewed, and at the end of the inquiry, we came to the conclusion that injection errors are more common than is generally supposed Many accidents, because they do not end fatally, are not reported

CAUSES OF ACCIDENTS

From the examination of the causes of accidents, both reported and unreported, we conclude that accidents and near accidents can be attributed to one or more of the following

(a) Failure to read or check the label

(b) The similarity in appearance of ampoules containing different drugs

(c) Reliance on verbal instruction.

(d) Failure to check premedication.

(e) Failure to dissolve completely such crystalline drugs as thiopentone sodium When the same ampoule is used for two separate doses, the second dose is considerably stronger than the first

(f) The storage of ampoules in colourless disinfecting fluids, whereby the contamination of the contents of a cracked ampoule escapes notice

(g) The inversion of a used, rubber capped bottle in a disinfecting fluid when the negative pressure may draw fluid into the bottle

(h) The use of gallipots of similar appearance for both injectable and non injectable fluids

Accidents which follow an injection include those in which faulty sterilisation causes a meningitis either by injection of infective organisms or of an irritant substance As and when labour, building materials, and the production of syringes and equipment permit, a syringe sterilisation service[1] should be available to all hospitals

STORAGE

Injectable Fluids

Arrangements were in the main satisfactory Cupboards for the storage of dangerous drugs and poisons were available in all hospitals The full value of the cupboard was lost at some hospitals because it was used for the storage of both poisonous and non-poisonous drugs

2 hospitals had partitioned boxes for the storage of ampoules of different drugs in separate compartments It was the usual practice to store ampoules in the original container supplied by the maker A few ampoules were usually stored in glass vessels containing an antiseptic, which were kept in the theatres or anæsthetic rooms Frequently ampoules containing drugs of widely different uses, such as *d* tubocurarine chloride, cinchocaine hydrochloride, nikethamide, and ephedrine hydrochloride, were stored in the one vessel Bottles containing injectable materials were usually stored in the cupboards until required for use

Non injectable Fluids

Storage arrangements were satisfactory

LABELLING

Injectable Fluids

Bottles and Flasks —These were used for local analgesics, saline infusion fluids, antidotes for drug overdosage, and occasionally muscle-relaxing drugs The legibility of the labels was satisfactory

Various methods had been adopted to prevent accidents 3 hospitals had a scheme of labelling whereby each type of injection prepared in the pharmaceutical department had a distinctive label 2 hospitals also used a series of labels of contrasting colours, one for each strength of solution supplied.

At most hospitals the labels prepared in the pharmaceutical department bore a date or batch number Labels of injection solutions were often covered with adhesive transparent tape to prevent soiling of the label Apparatus for indelible labelling were in use in the pharmaceutical departments of 3 hospitals

The strength of the solutions was expressed on labels in the following ways (1) percentage, (2) quantity in a stated volume, usually per ml , (3) part in volume—e g 1 in 1000

Local analgesics were usually labelled with the *B.P* names, although at 1 hospital all procaine hydrochloride solutions were labelled with the *B.P.* synonym, ethocaine hydrochloride Proprietary names were used in a few cases

There is a lack of uniformity in the potency of solutions of *d* tubocurarine chloride , strengths of 3 mg and 10 mg per ml are supplied by different manufacturers The danger of confusion is apparent

Ampoules —Almost all the hospital staffs criticised the labelling of ampoules

Paper labels are the most unsatisfactory , they are easily detached by steam sterilisation or immersion in antiseptic fluids, and the printing becomes almost illegible A number of hospitals were tying on the labels before treatment At 3 hospitals we were shown two ampoules supplied by a certain firm One contained *d* tubocurarine chloride solution, the other a solution of a pressor drug , the colour of the labels and the appearance of the ampoules were identical

Many manufacturers, in response to the recommendations[2] on the labelling of ampoules, are labelling with indelible ink The colours chosen for the printing, however, are usually unsatisfactory since the printing is read only with difficulty, white and black printing being particularly difficult to read

The anæsthetist and pharmacist of 1 hospital suggested bright blue and bright orange as the two most suitable colours A label printed from a block in relief letters so as to produce transparent lettering was particularly legible

Some manufacturers are using printers' ink for the labelling of ampoules This is unsatisfactory because the ink is partially soluble in industrial spirit, much used for the storing of ampoules, and it is not difficult to erase the printing

It was a general opinion that much irrelevant information is printed on ampoules so that the essential information is too small to be easily read

Non injectable Fluids

The labelling of these was generally satisfactory

There was, however, one dangerous practice—namely, the transfer of fluids from their original containers to others, such as lemonade and medicine bottles, labelled with adhesive tape.

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[1] See Medical Research Council war memorandum no 15 London H M Stationery Office, 1945

[2] See *Lancet* 1948, i, 883

Solutions of surface-acting analgesic drugs were invariably supplied in containers of distinctive shape and suitably labelled. A number of hospitals used a colouring for these solutions.

CONTAINERS

Injectable Fluids

The following bottles and flasks were used

'Clinbritic' bottles (at 17 hospitals), clinbritic bottles and screw-capped bottles (3) clinbritic bottles and flasks (1) screw-capped bottles (9), glass stoppered bottles (5) rubber capped vaccine bottles (3) 'Cellophane'-capped bottles (1) corked bottles (1) cotton wool and gauze plugged flasks (8) ampoules (1)

4 hospitals used containers of contrasting shape for each different injection. Clinbritic bottles were used in a number of hospitals to contain morphine and atropine injections

Injectable drugs of widely different action and uses were contained in *ampoules* of identical appearance—e.g., ampoules of distilled water for dissolving thiopentone sodium and those containing a solution of cinchocaine hydrochloride. Smaller ampoules of similar appearance contained *d* tubocurarine chloride, cinchocaine hydrochloride and nikethamide

Non-injectable Fluids

Containers for non injectable fluids were satisfactory in the majority of hospitals

METHODS OF USE

Injectable Fluids

Thiopentone sodium was used as an intravenous anæsthetic at all the hospitals visited. Ampoules of *5 g* and *1 g* were used at 41 hospitals, multi dose containers of *5 g* at 4 and both ampoules and multi dose containers at 2 At 1 of the hospitals where multi-dose containers were used it was the practice to prepare 500 ml. of solution at one time which lasted up to four days Solutions were usually prepared by the anæsthetist but the duty was entrusted to a sister at 2 hospitals and to a theatre technician at another

Cinchocaine hydrochloride was used at all hospitals where spinal analgesia was practised; amethocaine hydrochloride was less widely used. The syringe used for the analgesic was usually filled direct from the ampoule

Procaine amethocaine and cinchocaine were the drugs most used for local analgesia Procaine hydrochloride solutions, in strengths of 0·5–4% were used at all hospitals.

These solutions were commonly poured into vessels of various kinds before use. Gallipots were used for the purpose at 17 hospitals, 12 of which used the same kind of gallipot for the skin sterilising fluid, 2 a larger container and 3 used gallipots of different appearance At 2 hospitals, metal discs were placed in one or other of the pots to distinguish them

22 hospitals avoided confusion by using either one or two of the following vessels to hold the local analgesics: medicine glass, oil cup beaker glass measure flask, glass jug enamelled iron or stainless steel jug and enamelled iron or stainless steel bowl The local analgesic was poured into the vessels of choice by a sister or staff nurse at 37 hospitals. The process was checked by a surgeon or anæsthetist at 18 and by a sister or nurse at 19

Larger quantities of local analgesics, as used in tissue infiltration, were prepared by the anæsthetist at 2 hospitals and by a staff nurse at another

At 1 hospital all solutions of local analgesics were prepared by the anæsthetist The surgeon or anæsthetist filled the syringe direct from ampoules or bottles at 6 hospitals.

Non-injectable Fluids

Inhalation anæsthetics cleaning fluids, stimulant medicines, lubricants, &c fall under this description but it is the solutions for skin sterilisation and aseptic storing of ampoules and the surface analgesics that are responsible for accidents.

Many solutions used for skin preparation are uncoloured When these are used in a container similar to that holding the local analgesic, confusion may arise and the wrong fluid may be injected

The "continuous flow" bottle was used for the antiseptic at 4 hospitals; of convenient size and shape it allows the fluid to be poured slowly on to a swab held by forceps. Its use in most operating theatres would be impracticable however because an extra nurse would be required. Nevertheless it should prove useful in anæsthetic rooms, outpatient clinics and casualty departments. It is not only safe but economical

Ampoules were at most hospitals stored in glass jars containing an antiseptic Should an ampoule be cracked the contaminated contents may be injected

In addition to ether ether soap and industrial spirit the following solutions were used for skin preparation and storage of ampoules

Iodine the acridine antiseptics, trinitrophenol phenyl mercuric nitrate, cetrimide phenol chloroxylenol borax and formaldehyde mercuric chloride, and mercuric iodide

Mucous surface analgesics were at most hospitals poured into a gallipot or similar container for convenience At a number of hospitals the solutions were coloured

Accidents have been reported due to confusion between the names cocaine and procaine when verbal orders for these drugs have been given Accidental injection of a 2% amethocaine hydrochloride solution intended for use as a mucous surface analgesic, instead of a 0·2% solution has also occurred

COLOURING OF FLUIDS

Injectable Fluids

The British Pharmaceutical Codex Revision Committee thought that the colouring of injectable fluids is neither practicable nor advisable, and we agree

Non injectable Fluids

Many of these have little or no intrinsic colouring and the practice of colouring certain of them was common to all hospitals but there was no uniformity in the choice of the colours used

Mercuric chloride solutions, usually coloured blue were at 4 hospitals coloured green, pink, red and yellow Mercuric iodide solutions, usually coloured orange-pink, were at 2 hospitals coloured green and yellow Phenol solutions were coloured at 16 hospitals 12 had chosen pink, 2 blue and 2 green.

Other solutions were not usually coloured Only at 2 hospitals were all fluids used for external use distinctively coloured Both coloured and uncoloured solutions of mercuric iodide were supplied to the operating theatre of 1 hospital, and both coloured and uncoloured industrial spirit to that of another

STERILISATION OF SYRINGES

At 4 hospitals all anæsthetic syringes were autoclaved, and at 3 hospitals they were sterilised by dry heat. At 14 hospitals syringes were sterilised by boiling stored in an antiseptic fluid and rinsed before use with sterilised water At 24 hospitals intravenous and local analgesic syringes were boiled and those used for spinal analgesics either autoclaved or sterilised by dry heat

Autoclaved spinal sets containing syringes needles ampoules of drugs, &c. were used at 11 hospitals.

Spinal analgesic syringes were said to be autoclaved at a pressure of 4 lb per sq in for twenty min. at 1 hospital; the process is inadequate At another hospital spinal sets were said to be sterilised at 36–40 lb per sq in. for twenty min. but the appearance of an ampoule of amethocaine hydrochloride and glucose solution, said to have been subjected to the process, did not confirm that this pressure had been reached.

SUGGESTIONS

Every accident can usually be attributed to an error of judgment by somebody and nowhere is this more apparent than in accidents with injections There can be no ruse or device which will replace constant care and vigilance Responsibilities should be clearly defined the administration of the injection is that of the surgeon or anæsthetist, and the supplier, be he pharmacist or manufacturer, must ensure correct preparation

We make the following suggestions

(1) Ampoules containing different drugs should always be stored separately
(2) On no account should the contents of an unlabelled container be used, they should be immediately discarded
(3) No container should be labelled or re-labelled by any person other than a member of the staff of the pharmaceutical department of the hospital.
(4) Manufacturers should, as soon as facilities permit, implement the recommendations on the labelling of ampoules of anæsthetic drugs, and in particular those recommendations dealing with the text of the label[2] There is at present too much irrelevant information being printed on ampoules so that the essential information is too small to be easily read
(5) The printing on an ampoule should run parallel to its long axis Ampoules printed in this way are comparatively easy to read
(6) All ampoules containing solutions of spinal analgesics should be of a distinctive colour
(7) All ampoules containing solutions of muscle-relaxing drugs should be of a distinctive colour
(8) All injectable fluids should be checked by the user —i e, the surgeon or anæsthetist
(9) Orders for injectable materials should be in writing and clearly written.
(10) A mixing needle or cannula should be used to prepare solutions of thiopentone sodium
(11) Care should be taken in the checking of the premedication of the patient before giving an anæsthetic
(12) Solutions of morphine or atropine salts and all sedatives and stimulants should be used only from ampoules The similarity between the multi-dose containers used for these drugs and those containing solutions of local analgesics is a source of danger and their use in operating theatres should be prohibited
(13) (*a*) Solutions of drugs intended for use as local analgesics when applied to mucous surface should be coloured
    (*b*) All non-injectable fluids used for storage of ampoules and syringes should have a distinctive colour Any contamination of the contents of a cracked ampoule could then be seen.
    (*c*) All non-injectable fluids used for the sterilisation of the skin should have a distinctive colour Containers of these fluids are often placed alongside similar containers of the local analgesic solutions The colouring of the non-injectable fluids would make them easily distinguishable
(14) The British Pharmaceutical Codex Revision Committee might suggest a standard range of colourings for non-injectable fluids
(15) Standard containers for solutions to be injected should be used in the operating-theatres of all hospitals. Heat-resistant graduated beakers, in three sizes, 50 ml, 100 ml, and 300 ml, would be suitable[3]

We desire to express our thanks to those interviewed, who gave so generously of their time, often at great inconvenience, for their patience in answering our many questions The frank discussions and suggestions made have proved most helpful in the preparation of our paper Our thanks are also due to the matrons and the administrators of the hospitals for their courteous reception of us and for the arrangements made for our visits

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[3] This suggestion was referred to the British Standards Institutio and the preparation of a British Standard for such containe is being considered

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Reconstruction

THE HENGROVE EXPERIMENT

A Pædiatric General Practice

NORMAN J COOK
M.B Brist, D C.H.

THE state of pædiatric services in the National Health Service has been less discussed than that of obstetric and tuberculosis services, though they suffer similarly from divided and uncoordinated control

The health of the child is the responsibility of the local health authority (through the infant welfare and school health services), of the local executive council (through the child's general practitioner), and of the regional hospital board when necessary (through the hospital inpatient and outpatient departments) This division of responsibility, however, is no new phenomenon it existed before the National Health Service, and, except in the dental field, there is no evidence that children have suffered by the introduction of the service On the contrary, each of them is now entitled to the care of a general practitioner, and poor parents need no longer rely on hospital outpatient departments for the treatment of their offspring On the other hand, the practitioner receives no payment for supervising the healthy baby or child, as he does for looking after the health of the expectant mother, and lack of time discourages him from undertaking such work, which is now associated with public health departments

Discontent with the way in which a child is normally seen by several doctors—at home, school, and clinic—does not seem to be great, but the overlapping of services must be wasteful Two distinguished pædiatricians, Dr Helen Mackay and Prof Alan Moncrieff, have made important statements regretting the piecemeal arrangements (Mackay 1949, Moncrieff 1950), and the solution they offer is that when (when ?) group practice in healt centres becomes usual, a member of the group shoul specialise in pædiatrics and look after the children i health as well as in illness But a prerequisite for th scheme is a group practice, which means finding four o five doctors willing to subsidise to some extent the colleague specialising in pædiatrics

The Hengrove Experiment represents an attemp to demonstrate how a complete and nearly comprehensiv child-health service can be provided under one authorit and by one practitioner

THE EXPERIMENT

The Hengrove Child Health Centre was started in suburb of a large city in October, 1947 The object of th grandiloquent title, which was applied to a small waiting room and consulting-room in a semi detached suburba house, was to show parents that the doctor was intereste in the child's health as well as in his disease

Despite the unanimous opinion of medical friends that a practice for children only would never succeed, the number of patients grew, until removal to larger premises made it possible to provide a range of health service comparable to that provided for normal children by the local authority Nowadays, all patients are registered as in any other N H S practice

An infant-welfare clinic is held on one afternoon a week, to which babies can be brought for advice and examination An ailment can be treated on the spot and does not have to be referred elsewhere, as often happens at a local authority infant-welfare centre The doctor has the great advantage over the public-health medical office in that he has probably visited the home and knows the family background better When called to see a sick baby during the week, he already knows, or can tell from hi notes, how the baby has been progressing and what stage of feeding he has reached Parents are asked not to attend school clinics—not because of any lack of appreciation of the good work these do but in order to preserve the principle that supervision is continuous and that the child has only one doctor

With daily clinics and domiciliary visits, an ordinary general practitioner service is provided Children aged [illegible] years or more who are too old for infant welfare supervision, are invited to attend by appointment once a year for a complete physical examination including anthropometry and tuberculin testing This provides an opportunity for a check on the child s immunisation state and for a talk with the parent on matters of physical and mental health that would not be raised in the busy rush of an ordinary surgery The results of this routine examination form a valuable standard with which to compare the child if he or she should later become ill I am hoping that the detailed records will provide material for inquiry into morbidity in children

Children who have to be seen routinely more often than once a year are given appointments for special sessions. They include tuberculosis contacts and children with primary tuberculosis, asthma, nephritis or malnutrition The absence of waiting in a queue encourages mothers to bring their children regularly

CONCLUSIONS

Four years experience of running a wholly pædiatric general practice has convinced me that the service given to children is more efficient and effective than that obtainable under the ordinary piecemeal arrangements but I cannot claim that all difficulties have been surmounted It has not been possible so far to examine Hengrove Child Health Centre members in the school and this means that, for one attempting a comprehensive child health service, valuable contact with the child s teachers is lacking

School medical examinations will always have a place in a child health service partly because personal contact with the teachers and school atmosphere is essential for an understanding of the many management and behaviour problems that one has to treat in children and partly because they are the only means of reaching the children of a small minority of parents who will never bring their children for examination when invited

It is a valid criticism that the general practitioner pædiatrician may be ignorant of important facts about the health of his patients parents when he does not see them professionally and that lack of this knowledge may lead to a misunderstanding of the child s symptoms. An obvious example is the family where a parent has tuberculosis but does not acquaint the child s doctor of the fact. However this disadvantage is small compared with the many advantages of general pædiatric practice and it diminishes considerably when the G.P pædiatrician is in close contact with the doctor caring for the parents, as would be the case in a health centre

Finally, like all other general practitioners the G P pædiatrician must have access to hospital beds, because so many children s diseases require skilled nursing more than any other form of treatment

The method of remuneration in general practice in the National Health Service is an effective deterrent to a widespread development of the scheme described here To provide efficient care of the child in health and sickness 1000 child patients is a maximum for one doctor and for adequate recompense he must receive a much higher capitation fee than exists at present

I am well aware that a child health service such as that described above is not unique indeed such arrangements are commonplace in the United States Russia, and possibly some other countries But at a time when the conduct of general practice is so much under examination an account of the Hengrove Experiment may be of general interest

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In England Now

A Running Commentary by Peripatetic Correspondents

THE small hours found me in the theatre dealing with a child ill with peritonitis. Outside frost sparkled on the car as I drove home to cut sandwiches and heat coffee before I set out for London, 100 miles away Twelve hours later I was back at work in the same theatre But in those twelve hours I had seen the passing of a king I had watched in the sober charm that only London knows the sun glow suddenly to light the rich gold, azure, and gules of the Royal Standard draping the coffin, seen its light flash back from the jewels of the crown and sceptre as the wind ruffled the petals of the Queen Mother's wreath I had seen the sun glint on scarlet and steel of breastplate and tunic as the Household Cavalry rode by I had heard the beat of the reluctant footsteps of slowly marching men half muffled by the skirl of the pipers lament But above all I had shared with thousands of my countrymen the privilege of saying farewell to our King

* * *

The winter sunlight shone through the clear windows of St George s Chapel, and the pale blue of the sky seemed caught and concentrated in the blue carpet in the centre of the nave A gleam reflected from the pillars illuminated the red uniforms of the Yeomen of the Guard posted on either side of the entrance to the choir The scene had a timeless quality as though the interlacing tracery of the roof had, centuries ago caught time and held it in a net of stone And somehow outside time we waited while Elgar's music answered one enigma with another.

Then the choir wearing their surplices over mulberry coloured cassocks followed by the Prelate of the Order of the Garter and the Archbishops came slowly down the nave to stand at the open west door ; and all the company stood waiting with them in a silence which strangely sharpened our senses of sight and sound. The music of the pipes, accompanied by the rhythm of muffled drums, drew slowly nearer and then we heard the staccato marching of feet and the broken clatter of horses hooves after which there was a short silence suddenly pierced by the shrill wail of the bo suns whistles. Then came the slow gentle tread of eight men united by their burden and as the funeral service began the coffin, covered by the red and gold Royal Standard and bearing the crown, the orb, and the sceptre was borne glittering in the oblique sunlight, into the dim sanctuary beyond

Here was high drama, but it was drama, literally a doing, which was also reality ; it was symbolism not abstracted from life but added to it Kingship is a symbol made by man but greater than men, so that both King and subject are alike subject to it, and from the monarch it exacts a submission greater than any he requires from his people The ancients might have called it fate but fate is too external and mechanical a compulsion. It was the virtue of George VI that he accepted willingly and fully the obligation laid upon him, and by simply doing his duty he became great. To be born great, to have greatness thrust upon one, and then to achieve greatness is a conjunction Shakespeare can hardly have contemplated And if the price was to work without ceasing to subordinate even human relationships to the claims of duty and to be lonely yet never to be left alone it was a price paid gladly It is not for the subject to pity his Sovereign but to accept the sacrifice with pride and humility and to see in it an example for his own life

So as the coffin was lowered into the vault and this our brother was committed to the ground we returned into time with the sense that we had indeed been shown a mystery

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this paradox results from failure to take seriously the main responsibility of a clinical chief which is teaching As medical teachers are chosen today it is accidental if superior talent for teaching adorns the odd assortment of characteristics demanded of medical department heads."—Dr WILLIAM BENNETT BEAN *J Lab clin med* 1952 39 3

Letters to the Editor

PSYCHOLOGY AND THE MATERNITY UNIT

SIR,—As a midwife in charge of a maternity hospital, may I say how interested I was to read of the detailed and thorough investigation made on a subject so vitally important to women? I deplore, however, the suggestion that the conditions described are those generally found in maternity hospitals today The trained staff and pupil midwives are all trained to teach relaxation, and they thus continue in the labour ward what has already been taught to the mother by the physiotherapist antenatally

Mothercraft is taught to the mothers, and at the classes they are encouraged to ask questions. This friendly contact enables them to feel at home and to know the staff, so that they are not apprehensive when coming into hospital in labour In most hospitals there is friendly coöperation between the medical and nursing staff, who are united in their care of the mother I should have thought that this is the common practice and that Dr Tylden has been unfortunate in her experiences

Jessop Hospital for Women
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M J TAYLOR
Matron

SIR,—Dr Elizabeth Tylden's article is timely and should be studied by all who have a part in the midwifery service Many of us are well aware of the devastating effect on the patient when the personalities of her attendants conflict, as well as the need to teach more thoroughly the psychological aspects of childbearing.

It has long been recognised that continuity of care is important in midwifery, fostering as it does the valuable bond of confidence between the patient and her attendants This continuity has two aspects (1) continuity of care by the same group of attendants, and (2) continuity of teaching by all the members of that group The necessity for good team-work becomes more urgent and difficult as the number of persons concerned with the patient increases

The calm and happy atmosphere of a well-run maternity unit is possible only where there is complete understanding and cooperation between the members of the team and where they are united in their approach to the patient Much of the conflict apparent today is due to failure in the personal relationships of the members of the team Arbitrary decisions made by one person or group, without consultation about their effect on other aspects of patient care, may destroy the whole spirit of a unit, causing resentment and insecurity in the patient and her attendants Many of the contradictions could be resolved by free and frank discussion between the persons concerned We all aim to create a service that will promote normal and happy childbearing, and it is of the utmost importance that each member of the team should be able to perform his or her function in harmony with the other members of the team

It is inevitable that we should train students and pupil midwives, but it is not inevitable that they should feel "tense, negative, and aware only of possible criticism" in the process. Similarly, if the skills and contribution of each member of the team are recognised and respected, the failures in personal relationships will be few

From the midwife's point of view, the relation between the domiciliary midwife and the general practitioner, between the hospital midwife and the medical hierarchy, between the midwife and the physiotherapist, between the head midwife in the unit attached to a general hospital and the matron of the hospital, and between the supervisor of midwives and the nursing officers in the domiciliary service, are very important When relationships are satisfactory—and in my e they can be—the standard of patient care is very But in many instances the conflict alluded to b Dr Tylden is directly attributable to resentment th could be eliminated We must thank her for focusi our attention on these problems, the solving of whi is so essential to the well-being of the patient

Bristol Maternity Hospital.

N. B. DEANE
Matron.

SIR,—Dr Tylden's justifiable strictures on psychological malpractices of hospital maternity un apply equally well to domiciliary midwifery Ma of the malpractices, however, arise from the comp organisation of the hospital unit, and from difficulty in effecting a continuous relationship betwe the patient and the team responsible for her care. Ho pitals are required for the abnormal, but in medica obstetrically, and socially normal cases the patient often much better served emotionally in her h Here she is in a known, not a strange, and, her attendants being fewer, she can form a closer personal relationship with them

In a group general practice running its own materni service the team responsible for the care of the woman consists essentially of general-practitioner obstetrician and midwife with, in addition, husband, mother, mother-in-law, neighbours, and home help While the antenatal clinic continues to pay attention to the prevention of physical abnormalities (which if found are referred to hospital) emphasis is laid on the emotional aspects of pregnancy, and the patient is given continuous education She is, inter alia, weaned from the idea that the doctor performs any useful function by arriving to see the head crown

In my own group practice further education has been carried on by series of more formal talks, owing to of a building more ambitious schemes, such as film show physiotherapy, and mothercraft classes, have not been attempted However, it is the general practitioner obstetrician and midwife working in the closest coöperation who form the basis of the team to which the pregnant woman can look for a stable psycho background This background will not be complete without the ancillary services obtainable only at a centre

St. Mary Cray, Kent.

E TUCKMAN

TRAINING OF DEAF CHILDREN

SIR,—It is astonishing that people should still have the mistaken idea that nothing can be done for deaf children until they are about 5 years old The Act of 1944 made provision for the teaching of children from the age of 2 years The necessary facilities do not yet exist throughout the country, but the London County Council area is fortunate in possessin 4 nursery schools for the deaf, now attended by a of 89 children, 30 of whom come from outside London However, the age of 2 years, or even 18 months, which Miss Martin mentions in her letter of Dec 15 (p 1144), is still too late to start training if we the best possible results A child's deafness is suspected by the mother at 6–9 months, and this is not too early to start training This training must be given continuously by the parents at home under the supervision of a trained teacher of the deaf. The Audiology Unit at Golden Square is now supervising in this way the training of 10 children under 18 months old and 65 under 5 years, drawn from all parts of sou England. It is hoped that many will continue the education in ordinary schools

Training begun at 6–9 months takes full advanta of the normal speech-learning period when the child readily learns to listen—i e, develops its powers uditory discrimination. By 3 years this favourable period is over; and if training is not started until then, he child will stand little chance of ever acquiring fluent peech

Many deaf children's residual hearing is good enough, *f properly trained* for them to attend an ordinary school But they would need training from 6 to 12 months, and this is still unobtainable in most parts of the country Such children often receive no auditory raining at all all the teaching they receive being by methods intended for the totally or subtotally deaf By arranging speech and auditory training for all deaf children from the right age the country would save much or expenditure But a far more valuable gain would be the number of children saved from a life of sign language and inferior jobs after leaving school and enabled to play their parts in a normal environment.

London, W 1. EDITH WHETNALL.

AN UNUSUAL EPIDEMIC

Sir,—Your annotation of Feb 9 gives a good account of acute epidemic labyrinthitis, though it omits pain in the back of the neck, which is a very constant symptom

In 1949 I described[1] four cases of this condition occurring in a little epidemic in my practice and suggested that they might be caused by the virus of influenza. The chief reasons were: (*a*) history of contact between these cases and cases of clinical influenza in the same households, and (*b*) the fact that vertigo is not uncommon in otherwise typical influenza. Letters which I subsequently received suggested that the condition was fairly widespread, though not all cases are equally severe Dr H S Gaskell commenting on these cases, said

> "Although I find it mentioned in few if any books influenza is by far the most common cause of giddiness If a patient walks into the consulting room holding on to the furniture and complaining of a pain in the back of his neck, there is no need for the G.P to spend much time on the diagnosis."

Through the courtesy of Dr R M. Fry of Cambridge blood from two further cases in the same year was sent to the Virus Reference Laboratory, Colindale but the results were negative

One girl who had a mild but prolonged attack had a sister living in Chelsea, who was also attacked and this sister assured us that all the artists in that quarter were reeling about like drunks to the dismay of their baffled practitioners. The condition was known locally as the staggers. Whatever the cause it seems that the artistic output of Chelsea was for a while reduced to a mere trickle

Altogether in 1949 I saw twenty or thirty cases and each winter since then I have seen a few This winter I have seen three bad ones, but only one of them was in my own practice

It is interesting to think that people up and down the country may be crashing to the ground in scores; and yet, because each practice is its own little watertight compartment awareness of the condition has not reached the medical consciousness of the country as a whole.

Felsted Essex. PETER A WALFORD

Sir,—In the last eleven months I have seen six cases similar to those described in your annotation The following features were present in all six: (1) very sudden severe vertigo (2) mixed rotatory and horizontal nystagmus (3) vomiting without pronounced nausea (4) apyrexial course (5) no tinnitus or deafness (6) no incoördination and (7) no evidence then or since of thrombosis of the posterior inferior cerebellar artery disseminated sclerosis or Menière's syndrome There have been no recurrences

The dates in 1951 when these cases were first seen may be of interest these were March 13 and 15, and Nov 10 19 and 28 and Dec 19

Newcastle Staffs C B FRANKLIN

Sir,—Your annotation prompts me to record five cases conforming to the description you give The patients seen in March 1947 in Malaya were three British soldiers and two Indians, all in their twenties

Onset was sudden and dramatic with acute vertigo and the first two were thought to be suffering from Ménière's syndrome There was initial fever of 100°–101°F with some degree of pharyngitis and well marked nystagmus to one or other side There were no other abnormal signs in the central nervous system The cerebrospinal fluid was normal in two cases and was not done in the other three Blood counts were essentially normal the erythrocyte sedimentation rate was not above 10 mm in the first hour

The temperature settled in 24–72 hours, and vertigo had usually disappeared within 48 hours No special treatment other than rest was given.

I thought at the time that these patients had Gerlier's syndrome

London, W 1 IDRIS JONES

Sir,—Your annotation was a reassurance to myself and three of my colleagues in Oxford who were affected after Christmas with acute labyrinthitis for we had supposed that we were suffering from the premonitory symptoms of some obscure and unpleasant neurological complaint

On three successive mornings when getting out of bed or making a sudden turn of the head I became giddy and tended to stagger The symptom, however passed off during the course of the day and in every other respect I was perfectly well On mentioning the matter to my house surgeon I learnt that he too had had six similar attacks over a period of two weeks, during several of which he had to hold on to something for fear of falling to the ground Further inquiry revealed that two other colleagues had had severe attacks of vertigo one having fallen flat on getting up regaining his bed only with difficulty All have recovered completely

So far as I know there was no evidence of previous sore throats or of auditory or other symptoms No other members of their families were affected although it is possible that I myself might have acquired the infection from my house surgeon

Radcliffe Infirmary Oxford A S TILL.

INDUSTRIAL HEALTH SERVICES

Sir—I read with interest Dr Parker's letter in your issue of Feb 9 It seems to me that his approach is clearly that of a medical officer of health and not of an industrial medical officer There is no doubt that industrial medicine is essentially preventive medicine, and mental and physical health are indivisible and equally important

Dr Parker mentions management labour relations and later suggests an annual inspection by the local health staff Industrial medicine offers one of the most profitable fields for promoting health and good human relations and this is effected not by annual inspections or even routine inspections at long intervals but by close personal contact when the medical officer has obtained the confidence of a firm

The statement that there is no need to provide from our limited man power a separate industrial service; the basis exists in the public health department is unconvincing The basis for medium and small firms exists equally in the present factory medical inspectorate with their unrivalled experience and in the network of appointed factory doctors spread throughout the country What is needed is additional nurses doctors, health engineers, and other personnel to make the service truly effective A group unit such as the Slough Industrial

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[1] *Brit. med J* 1949 1, 881.

Health Service affords useful experience on which to build

As a matter of historical interest the factory medical service is senior to the public-health service

Farnham Royal, Bucks M E M HERFORD

DEAFNESS FROM DIHYDROSTREPTOMYCIN

SIR,—I read with the greatest interest the article by Dr Don and Dr Gregory (Jan 12) and the letter from Mr Walker and Miss Whetnall (Jan 19)

I saw in 1950 a similar case, which I reported in December, 1951, to the Société Médicale des Hôpitaux de Lyon

The patient was a woman, aged 30, who received, for a tuberculous empyema, 0 5 g of dihydrostreptomycin in her pleural space twice a week. Altogether 27 g of the drug was administered in this way, and she had no other streptomycin or dihydrostreptomycin treatment

The empyema was cured, but total deafness came on at the end of the course and is still complete The patient has had no sign of meningeal involvement

This case seems noteworthy because of the very small amount of the drug given, and because the inner-ear deafness was, and so far remains, complete

Lyon France LOUIS F PERRIN

PERNICIOUS ANÆMIA AND MACROCYTIC ANÆMIA IN UGANDA

SIR,—Referring to Dr Trowell's article of Oct 27, we should like to put on record the following facts lest it be thought that microcytic hypochromic anæmia is as rare in other parts of Africa as Dr Trowell states it to be in Uganda, for this might seriously confuse the problem of treatment, which is already sufficiently complicated

Our experience of the anæmias of the African in Portuguese East Africa and the coastal regions and highlands of Kenya makes it clear that microcytic hypochromic anæmias are by no means as rare as Dr Trowell says is the case in Uganda, in fact, in many of these tropical and subtropical regions they are the dominant anæmias, with mean corpuscular hæmoglobin (M C H) as low as 9 0 γγ, mean corpuscular hæmoglobin concentration (M C H C) down to 18%, and mean corpuscular volume (M C V) down to 45 c μ

These anæmias are probably associated with parasitic infestation with hookworms and schistosomes It seems unlikely, in view of recent work on iron metabolism, that malaria and other hæmolytic conditions produce an iron-deficient microcytic hypochromic anæmia, since in these conditions iron liberated from the red cells is available for rebuilding hæmoglobin In South Africa and Bechuanaland the situation, in those parts that we have investigated, appears to be rather different, perhaps on account of the lower incidence of parasitic infections

Speaking generally, in the diet of the African an intake of iron less than the recommended allowance is well-nigh impossible to attain Thus, in South Africa Walker and Arvidsson[1] have pointed out that the high cereal diet of the Bantu contains a plentiful amount of iron Of more importance, these workers have demonstrated a large uptake of iron during the preparation in iron utensils of the everyday foods, particularly fermented porridge and kaffir beer The high iron intake may well be one of the reasons for the rarity of hypochromic anæmia in South Africa, in addition, as Walker and Arvidsson have suggested, it may be the primary cause of the siderosis or abnormal deposition of iron reported to be so common among them

In view of these observations, therefore, we hesitate to say that a deficiency of iron in the diet is responsible for the hypochromic anæmias in the Africans observed by us Possibly some disturbance of absorption, synthesis, and utilisation, as well as iron losses from peripheral bleeding due to parasites, underlies these disorders Perhaps losses in the perspiration may be a factor, although this is by no means established The fact that these anæmias, as Lehmann has shown, respond to vermifuges without iron, as well as to iron alone, indicates that parasites and iron loss are important factors in their genesis

Another factor may be deficiency of certain amino acids, although vegetable proteins can be used in the synthesis of hæmoglobin We are of course aware that in low-grade infections there may be an iron deviation, b we cannot at present assess the importance of this fact

Infection with hookworms, schistosomes, and othe parasites is common and widespread in many regions o Africa, and it is generally admitted that the anæmia associated with such infections is of the microcytic hypochromic "iron deficient" type It would be surprising if such parasites and the associated anæmias did not occur in Uganda In fact, the work of Lehmann in Uganda shows that they are certainly present there, and that they respond to de worming[2]

Macrocytic and normocytic dyshæmopoietic megaloblastic anæmias also occur and are the predominant form in the areas around Nairobi, as the microcytic ones ar the dominant form in the coastal regions of Kenya At present we hesitate to suggest any reason for this difference in distribution These megaloblastic anæmias respond to the known hæmopoietic substances such as crude or refined liver, vitamin B_{12}, and folic acid, as well as to penicillin They do not respond to iron

Dr Trowell states that in his anæmias there is an iron deficiency imposed on an underlying macrocytosis, and that the latter comes to light as a result of treatment. Hence, we suppose, his term "dimorphic"

About 20% of the hypochromic microcytic or norm cytic anæmias have giant stab cells in the marrow, an in this respect may be regarded as dyshæmopoietic[3], but they do not become macrocytic, in the usually accepted sense of this word, as a result of treatment There is an increase in the reticulocytes with an expected increase in the M C V, mean corpuscular diameter (M C D), and mean corpuscular average thickness (M C A T), but this is found in all the hypochromic anæmias and is not evidence of "dimorphism" or any underlying macrocytosis These microcytic hypochrom "iron deficient" anæmias do not respond at all to suc substances as liver, vitamin B_{12}, folic acid, or penicillin, as, of course, is to be expected, and naturally megaloblasts are not found in the marrow and the indirect van den Bergh reaction is never raised

In addition to these two dominant types of anæmia there also occurs in Africans a normocytic anæmia associated with greatly enlarged spleen, a reticulocytosis of 5–15%, usually a raised indirect van den Bergh reaction, slightly raised saline fragility, and a much decreased survival-time of transfused erythrocytes Such anæmias respond to no form of treatment except splenectomy We wonder whether Dr Trowell's unresponsive anæmias may not belong to this group ?

There is surely no "mystery" about the African anæmias They fall into the already known and described types that have been seen in other parts of the world Nor in our opinion is there any mystery regarding the "macrocytosis" that follows treatment Dr Trowell appears to have based his diagnosis of macrocytosis on M C V alone This is unsatisfactory because its measurement is influenced by such factors as reticulocytosis and changes in the diameter thickness ratios of the cells which occur as a result of treatment. In Africans there may often be a reticulocytosis of 10–15%.

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[1] Walker, A R P Arvidsson U B *Nature Lond* 1950, 166 438 Walker, A R P *Brit med J* 1951 i 819

[2] Lehmann H *Lancet*, 1949 i 90

[3] Foy, H Kondi A Hargreaves, A *Trans R Soc trop Med Hyg* (in the press)

We cannot agree that there is no change in the M.C.V. in the hypochromic microcytic anæmias when successful treatment is instituted. Our own experience and that of others is that as a result of treatment the reticulocytes rise as well as the M.C.V., the M.C.D., and the M.C.A.T. Indeed it would be surprising if they did not.

We have shown [3] that in the *megaloblastic* macrocytic anæmias the relation between the M.C.V., M.C.D., M.C.A.T., and reticulocytosis may not always be a simple one, but appears to depend on the diameter thickness ratios of the original cell population before treatment. It should also be borne in mind that the spherocytosis can produce a high M.C.V. Dr Trowell does not make it clear what part reticulocytosis and changes in diameters and thicknesses played in his M.C.V. changes.

It should also be realised that macrocytosis may be due to a number of different factors, and that it can and does occur without megaloblastosis. In addition megaloblastic anæmias can occur that are not macrocytic, thus raising the question of the origin of macrocytosis and the fate of the megaloblast.

Dr Trowell considers that morphological factors have played an unduly important part in the diagnosis of what he refers to as macrocytic anæmias, and says that although this may be justified in Europeans it is not in Africans. Surely, Sir, morphological studies are as important in Africans as in Europeans?

With these facts in view there is no need to use such terms as dimorphic to describe what are perfectly usual changes in the diameters, thicknesses, and surfaces of the red-cell population in the anæmias before, during, and after treatment.

There can be no question that macrocytic or normocytic megaloblastic dyshæmopoietic anæmias occur in Africans that respond to all the known hæmopoietic substances, and that these anæmias may also be associated with a 'relative' iron deficiency, so that the M.C.H. and the M.C.H.C. are lower than those we usually saw in our Macedonian cases [4]; but their indices are never as low as in the microcytic hypochromic cases.

Regarding megaloblasts, many of our cases have the typical orthochromatic types such as those seen in pernicious anæmia in relapse and commonly in Macedonian and Indian cases. Many of our cases, however, have the intermediate types of megaloblast, which have been described by Jones and Dacie (the so-called megaloblastoids of Continental workers). Ramalingaswami [5] has described similar intermediate forms in the Indian 'nutritional' anæmias, and Dr I. Berhson has shown us similar cells from cases investigated at the South African Institute of Medical Research, Johannesburg. The blood picture and response to treatment in these cases with intermediate megaloblasts is similar to that in the anæmias with the more characteristic orthochromatic megaloblasts. It is now well known that the Indian, Macedonian, and African megaloblastic anæmias respond to refined as well as crude liver.

As for the anæmias of infection which Dr Trowell comments on, it is well known that such anæmias are not megaloblastic, although, of course, megaloblastic anæmias may be accompanied by infectious processes, in which case response to treatment will not occur until the infectious process has been dealt with. The cases we treated with penicillin were megaloblastic, and as we stated had no evidence whatever of infection. Further, they responded to penicillin alone given in minimal doses; but they did not respond if the penicillin was given in large doses, which one would not expect if an infectious process was involved.

Regarding the case of pernicious anæmia reported by Dr Trowell, the case that we originally reported as responding to penicillin was exactly similar; but in the absence of tests for intrinsic factor we preferred not to dogmatise as to whether it was or was not pernicious anæmia, and we think it would have been preferable had Dr Trowell done the same. We have since had another case of histamine-fast achlorhydric megaloblastic anæmia in a pure African in which there was complete absence of intrinsic factor, and this we suppose can be regarded as a true pernicious anæmia.

Surely if the African anæmias are ever to be clearly defined it is necessary to have precise and detailed information about all cases described.

Johannesburg, South Africa. HENRY FOY
ATHENA KONDI

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[4] Fairley, N. H., Bromfield, R. J., Foy, H., Kondi, A. *Ibid* 1938, 32, 132.

[5] Ramalingaswami, V., Menon, P. S. *Ind. J. med. Res.* 1949, 37, 471.

GAPS IN THE TUBERCULOSIS SERVICE

SIR,—In your leading article of Feb. 9 it was disappointing to find no reference to non-pulmonary tuberculosis. It is, therefore, worth while to point out that the average number of notifications of respiratory tuberculosis during the years 1943–49 was 43,160 annually, and that the average number of notifications of non-respiratory tuberculosis was 9460 annually. The ratio of non-respiratory to respiratory tuberculosis according to these notifications was, therefore, 1 : 4·6. This figure favours the respiratory incidence because combined lesions have to be notified as respiratory, and at Black Notley Hospital the incidence of combined lesions in adult patients with surgical tuberculosis has been almost 50%. In addition, many patients with non-respiratory tuberculosis are treated at general hospitals, and notifications are not always made of these patients. It would probably be fair to say that one-third of the tuberculous community suffer from extrapulmonary tuberculosis.

5-year follow-up studies of patients with renal and abdominal tuberculosis shows that probably not more than 60% are well at the end of this time, and of adults suffering from skeletal tuberculosis not more than 70% are well. These results could be greatly improved if there was sufficient accommodation in open-air tuberculosis hospitals for adult patients with non-respiratory tuberculosis; especially is this so now, when the introduction of streptomycin has augmented the benefits of surgery, which can be performed earlier and with greater success, especially in patients who are admitted in the early stages of the disease. Constitutional treatment has increased in importance; without this and streptomycin early operative treatment is unsafe and less effective.

Beds are urgently needed for this large group of patients with non-respiratory tuberculosis; the majority are eminently curable, and with modern methods of treatment can be returned to their homes and businesses in a reasonable time as efficient members of society.

Black Notley Hospital,
Braintree, Essex. M. C. WILKINSON

SIR,—I was interested to note your advocacy of convalescent homes for the tuberculous in order to help to keep ambulant, chronic, positive-sputum carriers in places of relative safety. Like many other desirable features in an integrated anti-tuberculosis scheme, the use of such "convalescent" beds was already well developed under the London County Council by the late Dr Noel Bardswell when I was privileged to join him in 1930. Between then and the outbreak of war in 1939 this scheme was widely developed, and Londoners had many hundreds of such beds at their disposal throughout the country. Sometimes called "homes" and sometimes "sanatoria," they were small places, reasonably comfortable, without special equipment, and inexpensive to run. Suitable patients for these homes were carefully selected, and in addition to receiving daily visits from a local general practitioner they were visited three or four times a year by headquarters medical staff, when every case was reviewed individually

Such was the development of this scheme that it became possible in the years immediately before the war to retain all positive-sputum cases indefinitely under some form of residential treatment, unless their home circumstances were known to be favourable for their return Unfortunately many of these beds were lost to Londoners at the start of the National Health Service in 1948 because they were situated outside London and the Home Counties Others, I believe, were closed by the new authorities because hey were thought to be "inefficient units" The development of similar homes would certainly be neficial

High Wood Hospital for Children
Brentwood, Essex

F J BENTLEY.

POISONING FROM PLANTS

SIR,—The correspondence on this subject reminded me of the following incident

While I was a house-officer in a West London hospital during the summer of 1950, a group of small boys attended the casualty department armed with a large specimen of an umbellifer This they had found growing in profusion on a river bank, and in playing with the long hollow stems as sticks, telescopes, and peashooters had all developed an urticarial rash where the stem had been in contact with their skin Some had patches on the hands, arms, and legs, and others a ring round the eyes or mouth. One boy had a generalised urticaria and fever and was admitted for a few days There were no other symptoms or signs, the plant had not been eaten

That these effects were in fact caused by this plant was, I think, proved by the distribution of the rash and the boys' statements, although the specimen provided failed to produce a similar effect on myself

The botanical department of the Natural History Museum kindly identified the plant as belonging to the genus heracleum—probably *H Mantegazzianum*, the giant hogweed. This native of the Caucasus, introduced into British gardens and now not uncommonly found wild, is related to the English cow parsnip or hogweed Final identification could not be made as this depends on the characteristics of the seeds, which were not available at the time

Sheffield.

J E MIDDLETON.

WAYS OF USING MASS RADIOGRAPHY

SIR,—Recent references in your columns to mass-radiography surveys of complete populations, combined with the announcement that such a survey is being planned for Islington, suggest that several such surveys may be starting in the near future It seems necessary, therefore, to stress the importance of these original surveys being planned and carried out in such a way that their effect on Mantoux-conversion rates and radiological "attack rates" of tuberculosis can be accurately measured. If this is not done social medicine will ape therapeutic medicine in using techniques whose efficacy remains a matter of opinion If, on the other hand, these early experiments are run scientifically and the results of the various surveys are really comparable, it will be possible to evaluate their use in the prevention of tuberculosis and to obtain insight into many other problems, such as the relationship between the prophylactic effect obtained and the percentage of the population examined radiographically, the prevalence of tuberculosis in different parts of the country, its relationship to environmental conditions, and the factors influencing people's willingness to be examined

A team from the Pneumoconiosis Research Unit, working with the Welsh Regional Hospital Board, have recently examined radiographically, under research conditions, approximately 90% of the adult population of a Welsh valley They would be very glad to help others avoid many of the mistakes they made To thinking of trying such work it may be said, in that it is difficult to examine more than 60% population It is very difficult to examine 90% and more difficult to be sure you have the age and sex of those you have not examined. It is, however, possible

It should also be noted that the P R U team used large films for examining miners and ex-miners in the valley. Dr Tattersall (Jan 26) seems rather bold making the implicit assumption that 35 mm film is adequate for diagnosing pneumoconiosis The errors of the diagnosis of pneumoconiosis, particularly early stages, on 35 mm film have been pointed Röhrl,[1] and his results have been fully confirmed P R U Inaccurate diagnosis of a disease for compensation is payable would certainly affect standing of the team in the area and would increase the lapse-rate

There is also another striking omission from all plans The importance of diagnosing as many early as possible is agreed but no one has yet suggested the films should be read in duplicate There is statistical evidence from workers in the U S A support such a procedure, and their results have fully confirmed at this unit In addition, at this time of film shortage, it is surely our duty to get the maximum possible information from a single film, and this can best be done by duplicate or even triplicate readings.

Medical Research Council
Pneumoconiosis Research Unit,
Llandough Hospital, Penarth,
Glam

A. L COCHRANE.

SIR,—The high tuberculosis yield among patients is undisputed, whether the cases are by mass radiography through its special service general practitioners or in a chest clinic In other w doctors' cases would be discovered whichever diagnostic channel were chosen The sources of active cases in 1951 at the chest clinic with which I am connected as follows mass miniature radiography 16%, 16%, and doctors' patients 68%.

On the other hand, the "few" active cases discovered by mobile units would probably not have been but for mass radiography The channel into which doctors' patients are to be directed is purely a matter of local arrangement between chest physicians and staffs of mass radiography units With the present shortage of large films the mass-radiography unit would seem to be the obvious choice The relief of over-burdened chest clinics and the patients' psychological preference for mass radiography are also points in favour Such temporary or local considerations, however, should not obscure the fact that the chief aim mass radiography is to find cases of tuberculosis would not otherwise be discovered

Is mass radiography best undertaken by mobile with a quick turnover or by static units in places by chest physicians and medical officers of health It seems to me that there is room for planning in directions Mobile units are a valuable spearhead in unexplored locality, their surveys for organised groups in known territory could be planned so as to repetition, and they should gradually make sessions their main task Static units should be tried in densely populated areas Their task should be to achieve the highest possible attendance of the residents with the ultimate aim of discovering all unknown cases of tuberculosis in a particular locality In these long-term surveys, doctors' patients would be given within the general framework of the survey

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[1] Röhrl W *In* Röntgenreihenuntersuchungen des Leipzig 1949 p 454

[2] Birkelo C C, Chamberlain, W E, Phelps P S, Schools, P Zacks D Yerushalmy J *J Amer med Ass* 1947, 133, 359

[3] Yerushalmy J, *Publ Hlth Rep Wash* 1947 62, 1431

[4] Garland L H *Radiology* 1949, 52 309

Static units face a more difficult test than mobile units in that they have to sustain for some time the interest of the public Whether this is possible in the Metropolitan area the Islington survey will show

Islington Mass X Ray Unit,
London.   G Z BRETT

PAIN IN THE BREAST

SIR,—In his thoughtful and stimulating address, published in your issue of Feb 9, Mr Atkins is highly critical of the use of the hollow needle whether to aspirate abscesses, puncture cysts or perform a ' drill biopsy in cases of suspected carcinoma. Regarding the first and last of these uses I entirely agree with him, but I would like to put in a plea for the aspiration of simple cysts of the breast, provided they are single and moderately large.

I cannot think of any valid argument against this procedure; for these cysts are clinically unmistakable and therefore the possibility of needling a carcinoma is minimal. On the other hand, to aspirate a cyst and cause a previously palpable lump to disappear is to reassure immediately and unequivocally an anxious woman who may not have slept for days or even weeks In addition, some of these cysts do not reappear after aspiration, and the patient may be saved an unnecessary operation.

Experience over many years has confirmed that aspiration of simple large cysts of the breast is one of the most worth while minor procedures in the whole alm of surgery It requires no particular skill so r Atkins would have those of us who practise it as ving 'a peculiar disposition or a poverty stricken mprehension" Surely this is too harsh

Glasgow   ROBERT MAILER.

EFFECT OF A.C.T.H ON HÆMOLYTIC ANÆMIA

SIR,—It was very interesting to read Dr Clearkin s ticle of Jan 26 which throws new light on a difficult eld.

The puzzle why anæmias associated with a positive oombs test fail to respond to A.C.T.H while others eemingly the majority) respond dramatically, seems ifficult to solve. I myself have treated with A.C.T.H cases of hæmolytic anæmia with a positive Coombs st In 3 recovery was prompt and to some extent sting while in the 4th the effect was slight In all cases electrophoretic tracings were taken repeatedly efore during and after treatment. In the 3 cases hich responded well gamma globulin values were levated—substantially in 2 and less substantially but efinitely in 1 There was a striking correlation between he size of the gamma globulin peak and the rate of lood destruction In the case which did not respond ll tracings were well within normal limits in this case he Coombs test was weakly positive, though hæmolysis luctuated around 10–15% reticulocytes.

During treatment with A.C.T.H the blood pictures in he 3 responsive cases returned to normal hæmolysis topped and correspondingly gamma globulin values were estored to normal. In 2 of these cases this state of affairs ersisted beyond two months, while in 1 there was some ncreased hæmolysis together with rather pronounced re-elevation of gamma globulin values. In the unaffected case there was some decrease of gamma-globulin values during treatment but the values were never outside normal limits.

In a further case of severe anæmia with a positive Coombs test, where hæmolysis was apparently stopped by splenectomy there was also a very pronounced levation of gamma globulin values. This patient also —as in the case described by Dr Clearkin—had positive Wassermann and Kahn tests though in fact luetic infection could be ruled out and no clinical signs of syphilis could be elicited The patient had been through protracted antiluetic treatment though she had constantly emphasised her innocence In this case the non specific reaction may be due to a strong anti complementary power in the serum probably connected with a fraction of the abnormal gamma-globulin

Such slight material does not permit of any broad conclusion but it seems to support the finding of Bjørneboe et al.[1] that A.C.T.H suppresses antibody formation It also seems to suggest an abnormality of antibody formation.

Aalborg Denmark   KAI BENT HANSEN

THE WORLD S FOOD

SIR,—Professor Nicol s letter of Feb 9 shows that concern about the possibility of a world food shortage is supported by facts The traditional agricultural system in Great Britain, and to a lesser extent in France has been based on the need for conserving soil fertility even in tenancy agreements the severe clauses about what can or cannot be done have been accepted without question and justified by experience After all it was the cropping potential in its land which largely prevented Great Britain being starved out in two world wars. Although starvation was avoided a substantial overdraft of fertility was incurred which is now being slowly repaid In the new lands which were opened up in the past 60 or 70 years, no attempt was made to maintain fertility and dust bowls and soil impoverishment are widespread.

Traditional methods of maintaining soil fertility just cannot keep pace with growing yields, and mineral deficiencies must therefore be made good by the use of so-called, artificials The effect on soil of increasingly heavy straw crops and the carrying of high yielding dairy cattle can be to some extent expressed arithmetically Not everyone recognises the degree to which, for example milk production as carried on today impoverishes a farm As much as 4 or 5 cwt of lime and 2 or 3 cwt of superphosphate are taken annually from every acre. A high proportion of these minerals leaves in the churns at the end of the lane never to return unless brought back in sacks. Nitrogen removal in milk is even greater In the past these losses were to some extent balanced because of the careful conservation of dung and urine, but modern public-health legislation governing milk production and the prevention of nuisances has now resulted in many poundsworth of fertility literally going down the drain The actual figures of loss for any holding can easily be calculated In a similar way human excreta of high manurial value is treated and put into rivers instead of being used in the old way at sewage farms which have gradually been abolished because they are said to smell. Many a cottage garden admired by passing motorists still owes its productivity to night soil

Before the last war the Germans became aware of the fertility and fertiliser problems beginning to arise and as a start were planning to abolish treatment plants for certain cities and to pipe the sewage effluent to arable farms, often at considerable distances While much may be done on a farm to conserve minerals an irreducible loss is nevertheless incurred This loss can be replaced only by using fresh supplies, some of which look like becoming increasingly scarce, quite apart from the sulphur shortage which exists anyway

Although the efficient conservation of liquid manure presents certain technical difficulties, these are not so great as the difficulties of overcoming ill informed prejudices about ecology which have been developing far too much in recent years. Still more when it is suggested that human excreta might usefully be used to help maintain fertility—and the time may come when it will have to be used—hands will be held up in horror! Recently I have been getting some bad old grassland into heart, and having insufficient dung on the place I arranged with the rural district council to empty the drain-cart on to a field before it was ploughed up The foreman remarked that years ago men in the district competed with each other for the spoil, now no one seemed to want it because its use was not supposed to be quite nice If we interfere appreciably with the biological cycle to satisfy æsthetic senses we must not complain if, in due course, the day of reckoning comes with shortage of various kinds As the Spanish proverb puts it there is nothing in life that you cannot have, but you must pay for it

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[1] Bjorneboe M., Fischel E. E. Stoerk, H C *J exp Med* 1951 93 37

London, W 1 W R THROWER

BACT COLI MENINGITIS IN THE NEWBORN

SIR,—The *Bacterium coli* group are dangerous pathogens in early infancy " In the first month, and especially in the first three weeks, no organism is more often the cause of pneumonia, *no organism is so often the cause* of meningitis "[1] Dunham[2] found *Bact coli* septicæmia in 10 out of 39 infants who had positive blood-cultures in the first month, while Silverman and Homan[3] concluded that the same organisms were responsible for 14 of their 25 cases of septicæmia without obvious source ("sepsis *of obscure origin in the newborn*") This infection has now increased in importance because new antibiotics, of definite value against gram-negative organisms, have improved the prospects of successful treatment

In early infancy antibiotics are prescribed on mere suspicion of *serious infection, without waiting for bacteriological* reports Since the clinical signs are often inconclusive and the course rapid, this is sound policy, but it is doubtful whether penicillin should still be chosen for the immediate attack The frequency of coliform infection would justify a preference for chloramphenicol in these *circumstances, or for streptomycin (alone or* with penicillin) when administration has to be parenteral. If penicillin is used against unknown organisms it should be accompanied at least by a sulphonamide in full dosage, but this combination should not be relied on when a serious coliform infection has been identified

The case, recorded by Dr Ebsworth and Dr Leys (Nov 17), of recovery from *Bact. coli* meningitis is of interest particularly because of the use of chloramphenicol Their reference, however, to "the apparent 100% mortality for this type of meningitis in the newborn" cannot be confirmed They state that they have not been able to trace a published case of complete recovery in a newborn infant, but such recoveries have been reported a number of times The earliest success may have been that of Rauch and Krinsky,[4] using sulphapyridine Recovery in the cases of Kagan et al[5] and Magnusson et al[6] was attributable to streptomycin I have not verified that recovery was complete in the case recorded by Kohlbry,[7] nor have I consulted reports in languages other than English

Occasional cures of *Bact coli* meningitis have thus been possible even in the newborn, with sulphonamides and streptomycin, but these probably represent only a small minority of treated cases Debré and Mozziconacci,[8] in their review of streptomycin treatment of septicæmia and meningitis due to intestinal organisms in infants, included 8 cases where meningitis was due to *Bact coli* alone, only 2 of these infants recovered, and neither was newborn It is to be hoped that experience with chloramphenicol, aureomycin, and *terramycin* will reveal a higher proportion of successful cases. (Polymyxin should probably be reserved for treatment of infection due to *Ps pyocyanea*) Meanwhile prognosis must continue to be very guarded, even where t initial recovery appears to be complete Hydrocephal is the main danger and is usually rapidly *progressi* but blindness also may follow[9] Laurell et al[10] treat a premature baby with aureomycin, the immedi results were good and progress was satisfactory up 4 months of age Blindness, mental defect, and inter hydrocephalus developed, however, and the child d at the age of 9 months

Treatment being unreliable, the early diagnosis this type of meningitis is most important This can achieved only by constantly seeking it in ill babi even when clinical evidence of meningitis is scan (In cases of *Bact coli* pneumonia, meningitis may co-ex without obvious additional signs) The anterior fo anelle seldom bulges, "tenseness," "fullness," a "sponginess" of the fontanelle are often mention but are difficult to judge The commonest presenta sign appears to be nothing more specific than reluctan to feed It has long been accepted that "blood cultu should always be taken when a newborn infant becon ill and the diagnosis is obscure"[2], the same may said of lumbar puncture, and if the spinal approach fa the operator should certainly proceed to cisternal ventricular puncture When the fluid obtained by lumb puncture is thought to be venous blood, it may be us for culture, the test-tubes provided should therefo be short, so that the blood can be reached and draw up through a lumbar-puncture needle for transfer to culture bottle Culture should be a routine procedu also when the blood is believed to be the result of intr cranial hæmorrhage, the signs of "cerebral irritation due to birth injury may easily be confused with tho due to neonatal meningitis

As regards the first week of life, this readiness to unde take lumbar puncture is in conflict with the views Craig[11] Of "intracranial irritation in the newborn Craig writes that "lumbar puncture is contra indicat even where the diagnosis remains in doubt," believi that the disturbance involved may aggravate the *effec* of birth injury Certainly meningitis at this age is rar but the possibility can be excluded only by lumb puncture, little reliance can be placed on such eviden as absence of fever or leucocytosis Craig[12] himself stat that after the first week of life lumbar puncture is essentia

The question of prevention is equally importan Of the numerous routes by which the meningeal infectio may take place,[4] some lend themselves to simp prophylactic measures

1 Meningocele is the most obvious portal of entry, whe the malformation is operable, the choice of antibiotic f treatment or prophylaxis of infection should be influence by the potential presence of *Bact coli*

2 Craig[12] emphasised that the source may be colifor infection of the skin, subcutaneous tissues, or surface mucou membranes, and that blood borne spread from these is mo likely in premature babies, in individual cases he found th the sources were stomatitis, rhinitis, cellulitis, and abscesse In the treatment of superficial sepsis in infants, *therefor* *Bact coli* must again be borne in mind

3 Infection may occasionally be transplacental, fro maternal pyelitis, intrapartum aspiration of infected liqu amnii or vaginal secretion is probably a commoner mecha nism[13] Thus when the mother has pyelitis, or when labou has been prolonged and genital infection is suspected,

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1 Macgregor A R *Edinb med J* 1943 50 332
2 Dunham E C *Amer J Dis Child* 1933 45, 229
3 Silverman, W A, Homan W E *Pediatrics*, 1949 3 157
4 Rauch S Krinsky, N *Amer J Dis Child* 1940 60 1380
5 Kagan B M, Hess, J H Mirman B, Lundeen E *Pediatrics*, 1949 4 479
6 Magnusson J H, Gillo G Laurell G *Acta pædiatr, Stockh* 1949 38 464
7 Kohlbry C O *Minn Med* 1942 25 200
8 Debré, R, Mozziconacci P *Brit med J* 1949, ii, 451
9 Hollis, C H Baty, J M *New Engl J Med* 1944, 230 27
10 Laurell, G Magnusson, J H, Werner B *Acta pædiatr Stockh* 1951, 40 174
11 Craig W S *Arch Dis Childh* 1950, 25, 325
12 Craig W S *Ibid* 1936, 11 171
13 Duval H R, Burrowes J T *Brit med J* 1948 i 1180

prophylactic course of streptomycin should be given to the baby A possible objection is that the infant might be more susceptible to neurotoxic effects than older persons, making it unjustifiable to use the drug on grounds of suspicion alone With the usual dosage (20 mg per lb body weight per day, in divided doses, for 5 days) toxic effects are highly improbable. Rubin et al.[14] have failed to detect damage to the fœtus from streptomycin administered to pregnant women

Dr Ebsworth and Dr Leys suggest that some cases of this very uncommon disease are not diagnosed Is it not probable that the proportion of missed cases is high, death being attributed in the absence of post mortem examination mainly to intracranial hæmorrhage or to non meningeal infection ?

In three Aberdeen hospitals dealing with infants from 1941 to 1950 only three cases of *Bact coli* meningitis were recognised, excluding those which followed spina bifida. All three occurred in 1949 in the Maternity Hospital, where approximately 21 000 live births took place during the ten year period These cases, which fell within my term as pædiatric registrar illustrate some of the points discussed above. In none of them was the mode of entry of infection proved

CASE 1.—One of twins the other being healthy Moderately asphyxiated at birth (weight $4^1/_2$ lb) but crying strongly within half an hour After 24 hours temperature 101 8 F but general condition appeared good. Next day the fever was still present, ? due to dehydration oral penicillin started in case of unidentified infection. The baby sucked poorly 3 days after birth he had become pale and slightly hypertonic; respiration grunting with thin shrill cry temperature 100·2°F This "cerebral irritation was attributed to birth injury or asphyxia; anterior fontanelle was not tense Lumbar puncture was attempted but was discontinued "because it was felt that further manipulation would be definitely harmful" Death aged $3^1/_2$ days

Post-mortem examination of the meninges showed scanty flecks of fibrinous exudate; a direct film revealed fibrinous material, numerous pus cells, and large numbers of gram negative organisms of coliform type " No more exact bacteriological diagnosis was possible. The mother had fever with mild urinary infection (organism not confirmed) on the day after delivery

The diagnosis was unsuspected Too much reliance was placed on the power of penicillin, and possible infection was not adequately sought.

CASE 2.—Second of twins, the other being healthy Weight $5^1/_2$ lb. Good recovery from asphyxia after long labour and forceps delivery Became ill on 11th day of life without obvious localised disease. Temperature 103 6 F mild vomiting and diarrhœa. Limp and miserable pale and slightly dehydrated; spleen enlarged; fontanelle tension normal. Septicæmia suspected; course of penicillin and Sulphatriad started. Next day attempted lumbar puncture yielded only a little blood which was sterile on culture. Good progress; after 7 days drugs were stopped and " now looks better than ever in his life " On 22nd day fever recurred toxic appearance, vomiting and diarrhœa " Again appears to have some serious infection, the site of which is not detected. Penicillin and sulphamerazine again produced good response; much better in 3 days, and seemed in full health when treatment stopped after 11 days. Discharged aged 36 days, vigorous and thriving

So far success appeared to have been achieved despite failure to define the site or nature of infection Blood-culture had not been taken before treatment. There had been no signs to suggest meningitis.

After 24 hours vomiting irritability and mild fever recurred Pale but still feeding well On 40th day in Royal Aberdeen Hospital for Sick Children, the anterior fontanelle was found to bulge slightly although still no stiffness of neck or back. Temperature 99–101°F Lumbar puncture produced purulent fluid from which *Bact. coli* was cultured on two occasions. Intrathecal and intramuscular streptomycin was without effect; death aged 6 weeks. Before death there were convulsions and low tension of fontanelle Post-mortem examination showed copious green exudate in which it was impossible to demonstrate any organisms.

The relapses suggest that the whole course of the illness was due to *Bact coli* infection (possibly meningitis throughout) which was partly controlled by the early treatment

CASE 3—Moderate asphyxia after easy forceps delivery, second stage of labour had lasted $3^1/_2$ hours owing to maternal exhaustion Weight $5^1/_2$ lb After 24 hours, " a feeble uneasy child but with no obvious disease On 3rd day he became hypertonic, with neck and back stiffness and partial neck retraction no bulging of anterior fontanelle temperature 100·4°F He appeared grey toxic and seriously ill the facies was so like that in case 2 that *Bact coli* infection was suspected and treatment with streptomycin as well as penicillin was started *Bact coli* confirmed in cultures of blood and cerebrospinal fluid. Intramuscular streptomycin continued for 9 days to a total of 0·925 g; four intrathecal doses of 25 mg given, two by cisternal and two by lumbar puncture Penicillin discontinued after the first 3 days. Recovery was complete the child being physically and mentally normal when last seen at the age of $2^1/_2$ years.

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M. S FRASER.

THE TREATMENT OF PEPTIC ULCER

SIR,—Dr Todd's article of Jan 19 serves a useful purpose in making us question our beliefs, but he does not help his purpose by over-statement. It is my experience that in treating peptic ulcer adjustment of material and emotional difficulties is a very important measure and for that purpose I run a weekly clinic for about three hundred patients attending at variable intervals. To some extent I would confirm Dr Todd's view that often many details of treatment are unnecessary; but in almost every case a few are adopted. I cannot say exactly how many find modification of diet essential but am sure it is quite a proportion a considerable number find alkalis important, a few benefit from phenobarbitone and so on (I am speaking of patients kept at work on medical treatment for years) To classify all ulcers together—duodenal gastric, œsophageal or anastomotic whether with hourglass contraction pyloric stenosis, pylorospasm, or hypermotility—is useless Equally it is useless to classify together the hypersensitive patient with minimal difficulties and the hyposensitive overwhelmed with work and misfortunes, as likely to need the same treatment Because no treatment suits all patients Dr Todd condemns all for all—a fallacious argument

It is strange that Dr Todd cites starvation treatment of hæmatemesis to Dr Avery Jones who was active in its abolition or proclaims coöperation of specialist with general practitioner when few can have urged such coöperation more, or tried harder to put it into effect, than Dr Avery Jones. A happy device gave readers of detective fiction their Dr Watson and a helpful device us our Dr Todd. But it is a pity he tends to adopt as his motto Wot s the good of anyfink ? W'y nuffink.

Hove

W A BOURNE.

SIR—If Dr Todd (Feb 16) considers the treatment of gastroduodenal bleeding in recent years, he will remember that after Meulengracht produced evidence of the beneficial effect of liberal feeding this was introduced fairly quickly into this country when further confirmatory work had come from Prof L J Witts. The old and traditional way was thus discarded when evidence against it was found

Orthodox régimes in the past have usually had some theoretical basis which appeared valid. Nevertheless, it is essential for those who prescribe such treatment to be prepared at all times to review it in the light of increasing knowledge. I dispute that the onus of proof lies only with the advocates of a remedy I maintain that it is up to all of us including Dr Todd to study the natural history and treatment of disease and so improve the traditional formulas to which he is so allergic.

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[14] Rubin, A Winston J Rutledge M. L. *Amer J Dis Child* 1951 82 14

Dr Todd castigates the special revision articles for general practitioners as a series of ex-cathedra pronouncements by high authorities for simple creatures Surely such articles are designed *to set out modern* practice in a form most helpful to a busy practitioner I believe that, even in the absence of scientific proof, one should continue to record in print the generally accepted lines of treatment Life would be very difficult for practitioners if there were no accepted patterns of therapy *for common maladies* The *proper place* for raising controversial aspects is in a scientific article recording careful studies and published in a journal readily available to practitioners This is not to deny, however, that well-written provocative armchair articles also have a proper place in medical journals.

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F AVERY JONES

EVOLUTION OF THE TOXIC THYROID GLAND

SIR,—Dr Lennox (Feb 9) has set out five alternative explanations of the progressive phases in the degenerating toxic thyroid, described in my article of Nov 24

(*1*) "*The whole series may be the result of a single abnormal stimulus on thyroids of varying reactivity*"

I have never suggested that the stimulus is abnormal I believe that the same thyrotropic hormone, acting on the target epithelial cells of the thyroid, may be increased in quantity or prolonged in action Similarly, the older target cells atrophy and degenerate, and the amount of thyroxine produced per unit quantity of hormone decreases pari passu In the phase of epithelial hyperplasia, with utilisation of all the thyrotropic hormone, the blood-stream is relatively flooded with thyroxine As succeeding phases develop, the relative excess of thyrotropic hormone accumulates in the blood The menopause, with its obviously diminished ovarian hormone stimulus, produces a still greater surplus of thyrotropic hormone Degeneration and cellular involution are thus accelerated at the menopause when fibrolymphoid hyperplasia is commonest This explains, I believe, the figures I obtained for 30 patients with Hashimoto's fibrolymphoid hyperplasia 18 (60%) had mild hyperthyroidism, 10 (33%) had a moderate degree, and only 2 (7%) had a severe thyrotoxicosis compared with the 40% in cases of epithelial hyperplasia It is thus not only the intensity but the duration of the stimulus which is of importance, as well as the receptivity and reaction of the target cells

(*2*) "*Toxic goitre and Hashimoto's disease are two wholly distinct diseases which happen to overlap*"

Operations on 22 patients whose goitres recurred in my series demonstrate conclusively that the fibrolymphoid disease of Hashimoto is a natural, if usually late, successor to the toxic goitre of epithelial hyperplasia. Ideally, these consecutive changes should be demonstrated in the same individual, but it is obviously impracticable to perform frequent biopsies so timed as to display them My observations have been confined, therefore, to patients who have had two or more operations. If I found progression from one phase to the next over the whole range in different individuals, I inferred a *probability* of progression in the same individual from start to finish Where I found a progression through overlapping phases—e g, 2–4 and 3–5—the weight of the evidence was immeasurably increased When it was seen that the clinical signs and symptoms of each patient varied with the pathological changes, the *possibility* of this progression became very near to *certainty*

I am firmly convinced that conclusive evidence of progression is provided by this study of recurrence

(*3*) "*The same two diseases are distinct but one predisposes to the other*"

Chance is a wonderful leveller, but can it systematically survive the devastating probe of a severely critical statistical scrutiny of steadily changing clinical phenomena? The clinical features were divided into a multiplicity of facets Every one of these was further assessed as a percentage of each of the six phases and not of the total The same features and percentages were regularly repeated in the analysis of the clinical, macroscopical, and microscopical details of 212, 510, 800, and finally 2114 patients Figure and graph speak for themselves to show an undoubted and smooth gradation from epithelial hyperplasia to fibrosis

(*4*) "*The series represents the intermingling of three or four or any number of unrecognised entities*"

I have never stated that the six phases represent *all* the diseases of the thyroid, they do not, for instance, include thyroiditis or malignancy, although I have seen malignant involvement of each phase Furthermore, these phases have been shown to be consecutive and not associated, as Dr Lennox would suggest The process may be halted at any stage, and in some instances it is reversible To lay down that the ætiology of toxic goitre is a total mystery and then to add that, until this is understood, no-one dare venture into the Elysian fields of thyroid disease, is surely putting the clock back many centuries—enough to make William of Occam turn in his grave!

(*5*) "*Lymphoid tissue in the human thyroid is a reaction to infection by a thyroxinophilic virus*"

Lucas and Breitmayer [1] have found a filtrable agent in neoplastic lymphoid tumours invading the pancreas of turkeys, chickens, and ducks Dr Lucas, in a personal communication to me two years ago, was firmly convinced that this neoplastic process does not occur in man It may be remembered that Hashimoto [2] suggested a resemblance between his disease and that of Mickulicz Graham [3] mentioned a possible association with lymphosarcoma, but no one believes in this nowadays Virus infection has been ascribed by Crile [4] to subacute thyroiditis which, resolving completely, is a separate entity It has no relation whatsoever to the six phases The name "thyroiditis," with its implication of inflammation, is rarely applied nowadays to Hashimoto's disease Dr Lennox's dismissal of this theory as "fantastic" will meet with general approval

Dr Lennox suspected "some plausible but illegitimate link" in my chain of progression He has failed to show it

London, N W

T LEVITT

PHYSICAL FITNESS AND EXERCISES IN THE BATH

SIR,—In your issue of Nov 10, Dr Crofts suggests that the prevention of obesity is of great importance in promoting a long life, and all life assurance offices recognise that this is so An active life and diet restricted to bodily needs promote a lean and healthy body, but while such a diet and physical exercise promote well being and protect against the degenerative diseases, all writers on this subject agree that the healthy body does not protect against infectious diseases such as the common fevers, typhus, smallpox, and plague, and does not lessen mortality from these

Open air workers are much less susceptible than others to catarrhal infections of the respiratory tract

This is due, I think, not only to less exposure to the infection that takes place in rooms by the mucous spray coughed, sneezed, and spoken out into the air, but to the fact that cold air contains very little water vapour and takes up therefore a great deal from the respiratory membrane, the expired air being almost saturated near body temperature, this entails more passage of fluid from the capillaries through the membrane and a greater flow of blood through these capillaries. The mucus secreted is germicidal, *and the membranes are* washed clean by the extra flow and by the ciliated epithelium which lines the air passages

In crowded warm rooms the air is far more saturated with moisture and the defence therefore less, while infection from the crowd and from room dust is far greater Exercise in the

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1 Lucas A M Craig, C O, Oakberg, E F, Breitmayer J B *Growth* 1949, 13, 339
2 Hashimoto H *Arch klin Chir* 1912, 97 219
3 Graham, A *West J Surg* 1931 39, 681
4 Crile, G jun *Ann Surg* 1948, 127, 640

open air by increasing the respiration greatly enhances this defence up to ten times or more. On a cold windy day the nose runs and the eyes water not because of catching cold but because those parts have to be kept up to near body temperature by a greater blood flow and secretion Cold is beneficial while warm crowded places promote so called "colds" and pneumonia.

In my own case, age $85\frac{1}{2}$ I have found that Mr T R Togna s system of exercises in the bath are of great value in keeping all parts of my body, muscle, joints, and skin supple and in good condition; Mr Togna, now at the age of 78 has kept himself extraordinarily fit by the exercises which he evolved when in poor health at the age of 52 and has regularly carried on since He is very muscular and lean and can run as easily as a youth not only on the flat but also up stairs with remarkable agility I myself can easily walk two miles twice a day

In the bath under water the body is supported by the walls of the bath, while the water lessens the weight of the body so that a 10-stone man weighs only about 10 lb The exercises are designed to move all parts of the body and give self massage of the skin and muscles.

Taking such exercise with ease under water the pulse hardly alters in rate and the blood pressure remains unchanged; the respiration compared with the exercises in the air is little increased while the oxygen used is put up remarkably over the basal resting value This is due to the exercises increasing the capillary blood-flow in all parts; the warm water opens the cutaneous vessels, and so the venous return to the heart is increased while the oxygen is used for the energy spent in the movements and on the waste products in the tissues being oxidised To save fuel and water the body need not be deeply covered with warm water so long as the parts being moved are under water

The oxygen used per pulse-beat was considerably put up in the case of Mr Togna, from 4 7 c.cm. to 17 7 c.cm.; and two hours after it was still up being 5·5 c.cm.

This result was confirmed in a lesser degree by observation under my control of six subjects between the ages of 21 and 84 The oxygen used is double or treble that used during rest In muscle the number of capillaries is enormous (4000 per c.mm. according to Krogh) the blood flow is increased some forty times during muscular action, and with the help of its compressive activity aided by the valves in the veins and the action of the respiratory pump the venous blood is well returned to the heart. In the horizontal position there is no counteracting influence of gravity as in exercise in the air in the upright position. In the active monkey or wild man venous return is almost ceaselessly aided by activity of the muscles during the day time and by changes of posture and depth of respiration.

In the sedentary worker on the other hand there is much less muscular aid given to capillary circulation and venous return, and the heart has to do more to maintain the flow of blood; this may possibly have something to do with the cause of heart trouble in such workers, who may be subject to emotional excitement and strain in their daily life which puts up the pulse rate without the accompaniment of muscular work.

The increased circulation and oxygen produced by the exercises in the bath clear the body of waste products and cause an efficient supply of hormones from the endocrine glands while the exercises of the abdominal muscles and their massage promotes the movement of the bowels The exercises are most suitable for rehabilitation as they are done with so little effort and fatigue, and especially for treatment of tuberculosis of the lungs in the first stage of exercise allowed after rest in bed particularly as the lung ventilation is increased less than in exercise taken in the air when energy is spent in supporting body weight

The American Medical Association gives evidence that early physical activity judiciously applied is indispensable for successful treatment in cardiovascular diseases obstetrics surgery orthopædics, and psychiatry Prolonged rest does more harm than good even in serious diseases such as angina pectoris and myocardial infarction Rest imposed on pregnant women is an unjust and unnecessary penalty for motherhood In psychiatric and neuropsychiatric cases, restriction of physical activities shuts off one of the most natural and important outlets for available energy

I think Mr Togna s exercises in the bath answer the need The exercises have helped to keep well for some years several who have suffered from symptoms of coronary thrombosis and a case of diabetes has been reported in which the exercises reduced the blood sugar to normal which a course of treatment at Vichy had failed to do

Mr Togna is an enthusiast for his method from which he derives no pecuniary advantage. His pamphlet, *Exercises in the Bath* fully illustrated can be obtained from him at the Tuscan Hotel Shaftesbury Avenue London, W 1; and he will be glad to give a demonstration of the exercises

Corton near Lowestoft. LEONARD HILL.

ECONOMY IN X RAY FILM

SIR,—Dr Brailsford s choice (Feb 9) of Sir James Paget as a shining example to confound my (not entirely serious) comments on clinical diagnosis is singularly unfortunate

He gives that brilliant man far less than his due of praise Three maladies bear the name of Paget a disease of bone, a disease of the nipple, and a recurring tumour of the abdominal wall Little has since been added to Paget s original descriptions of *any* of these conditions but it is noteworthy that all three proclaim their presence by 'a surface lump or blemish' In Paget's famous case the patient first consulted him with a swelling of the tibia, and I believe that he kept this patient under observation until his death 20 years later —a supreme example of clinical fortitude Towards the end of this long vigil even the most modern of clinicians would probably have detected that something was seriously amiss Paget was content to accept Czerny s title of osteitis deformans for his disease but the great value of the röntgen ray lies in its power to detect the osteitis before the deformans.

Mr Longland s amusing letter last week makes me blush with shame

His intriguing method of prescribing antibiotics by sniffing at the patients fills a long felt want and would have been appreciated by the late Prof K. D Wilkinson, who once tracked down a case of typhoid in someone else s clinic by his keenly developed olfactory sense Most of us, however are so inadequately equipped that we should lose the scent quite early in the investigation

His views on the diagnosis of lumps in the breast are terrifying in the extreme All honest surgeons will agree that the percentage of error in this field is depressingly high but it is to be hoped that no-one still believes the old myth that a swelling palpable with the flat of the hand is a carcinoma. Surely no surgeon would embark on a radical mastectomy without visible evidence of the phenomena of retraction or adherence or careful inspection of the cut surface or the report on a frozen or routine section—and it might not be a bad idea to have a radiograph of the lungs. The eye no match for the hand indeed!

I take it that Mr Longland s references to the ear imply the use of that quaint instrument the stethoscope which certainly does *not* tell us ' all we want to know about the movements of the bowel. I am sure that Mr Longland knows as well as I do that the bowel sounds may be absent in complete mechanical obstruction, and that the silence of the grave does not necessarily indicate paralysis of the gut

I am less familiar with its use for telling how the air is getting along in the lungs but an interesting experiment was carried out recently at a large and very efficient chest hospital The chest physicians on the staff several distinguished physicians from other hospitals, and a couple of surgeons were invited to make three examinations of all the patients in one ward. They listened at a marked point on the chest they percussed a marked area and they were required to say whether the trachea was central or not Their opinions were recorded, and they repeated the process in another ward The whole series of examinations, in both wards, was then repeated and again recorded I understand that the inconsistencies were most instructive, and that it was remarkable how a "dull" chest could become "hyperresonant" within the hour

I am sorry that Mr Longland discards so lightly the sense of taste Its use in the clinical diagnosis of diabetes is well known

Barnet General Hospital,
Herts
V J DOWNIE

MEDICINE WITHIN THE ATLANTIC COMMUNITY

SIR,—Dr Meiklejohn, in his article last week, deplores the "grave tendency to use the ideas of foreigners without acknowledgment" In Britain, at least, I think that it is doubtful if much conscious plagiarism occurs

What is more important is that present difficulties of publication in this country should contribute to making this suspicion possible in America Because of the paper shortage and printing difficulties, a British worker may find that a year or more elapses between completion of his work and publication of his findings

In any subject it is to be expected that one source reference will independently stimulate several groups of workers Inevitably their research will cover much common ground, and may lead to very similar conclusions In America there are many more journals devoted to one subject, and more space to each journal, than in Britain Thus American workers may begin work several months after the British, but still have their report printed first When the British paper does appear, its authors may seem to have plagiarised the foreign workers without any reference to their work

[illegible] difficulty could be partly resolved if more British journals could adopt the practice of printing with each [illegible] the date on which it was submitted for publication [illegible] done already in many American and a few British journals With this knowledge it would be easy to assess priority, and to assign the absence of references and acknowledgments to its true cause—that these articles did not exist at the time the work was actually being done

Ruislip Middlesex
DEREK HOBSON

*** The date of publication is not an ideal criterion in judging priority, but it has the merit of being both definite and public The date when a paper was received for publication cannot have a similar final significance unless the editor also guarantees that no word has since been altered As for the speed of appearance of reports in America, surely Dr Hobson has allowed distance to lend some enchantment to the view ?—ED L

PROCTALGIA FUGAX

SIR,—This condition is intermittently resuscitated in the journals, perhaps because, although well recognised, it has received the scantiest attention in textbooks

I have been unable to trace the earliest reference, but in 1917 MacAllen[1] published a short note on Rectal Crises of Non tabetic Origin Thaysen[2] (who coined the term proctalgia fugax) gave a detailed description with several Continental references This stimulated a number of letters to your columns from which it appeared that there was fairly general agreement on the symptomatology but widely differing opinions as to the nature of the "cramp" or "spasm" and the causation of attacks Among the explanations advanced were tabetic crisis, aura of epilepsy, tic, visual migraine, and venous engorgement following sexual excitement No evidence of pathology was forthcoming whenever sigmoidoscopy had been performed, and rectal neuralgia was perhaps the most satisfactory explanation In a susceptible subject it is reasonable to suppose that all sorts of provocations might produce an attack

Sir Henry Tidy (Feb 9) reminds us of the discussion at the British Society of Gastro-Enterology a few years ago On that occasion several members spoke from personal experience Not that this encouraged the idea of another "doctors' disease", for probably it occurs more commonly than is generally supposed, although we are rarely consulted

Your correspondent of Jan 5 (p 52) emphasises the psychological background to a far greater extent than any predecessor, and claims ability to provoke attacks by inducing the appropriate frame of mind It is rather remarkable that he suffered from the early age of 6 In my experience the condition is far commoner in males, usually starts in adult life—this supports the idea of a sexual association—and, as Sir Henry Tidy observes, ceases in late middle life

London W 1
ADOLPHE ABRAHAMS

SIR,—This curious pain is either idiopathic proctodynia or a spasm of the rectum which seems not to include the anal sphincter It afflicts both sexes and at a time when the body is relaxed, usually the night The pain can be severe, with pallor, sweating, and faintness I have thought that adhesions from a pelvic peritonitis are contributory, but unexplained pains are open to any hypothesis

Cyril Ogle prescribed suppositories of belladonna—gr 1 in cocoa butter These gave relief, and so do any of the soothing suppositories As an emergency treatment the *genupectoral position is effective Perhaps* in this way the weight of a loaded sigmoid is taken off the rectum and negative pressure induced so that the anal sphincter relaxes and the rectum fills with air

London, W.1
H C H BULL.

ACUTE INFECTIONS OF THE FINGERS AND HAND

SIR,—For the help of Mr Patrick Clarkson and any others who wish to compare their results with ours, may I reiterate two important points in the reports from our Hand Clinic ?

(1) The disability period is the time from the onset disease to the end of treatment and includes the delay betwee the onset of disease and the beginning of treatment

(2) The figures we report include all cases referred to th clinic except those who default before completion of treatmen They include cases which have been treated elsewhere befo attendance, and as Mr Bailey has shown these are often th cases with complications that delay healing and therefo raise the average treatment time

Were we to exclude these cases we could show bett results Our figures are published to show what achieved in the clinic in spite of handicaps. Being teaching unit, we cannot disclaim all responsibility f what is done outside the hospital or for the delay in seekin treatment

—By an unfortunate slip Mr Clarkson has failed to d justice to our results In the example of pulp abscess h compares Mr Bailey's duration of total disability with th duration of treatment in other series Mr Bailey's treat ment period is 12 7 days, which compares favourabl with Anderson's figure of 15 8 days, and is nearly good as the published results of excision and suture

Mr Clarkson does not say whether he would advocat the treatment he describes for general use It has bee our aim to devise a simple method that can be adopte by any practitioner working single-handed, since it not practicable for all *hand infections to* be treated hospital It is still our claim that no method fulfilli this criterion has given better results than ours

University College Hospital
London
R S PILCHER

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1 MacAllen A *Glasg med J* September 1917
2 Thaysen Th E H *Lancet* 1935 ii 243

Public Health

An Unusual Skin Condition

A SMALL outbreak of a puzzling dermatological affection is reported from Cheltenham by Dr Donald E Morley, the medical officer of health

The first wave of cases began early in January It did not last long and by the third week of that month very few cases were occurring A second wave started in the first few days of February and the outbreak continues Since the condition is not notifiable and has no serious effects, its true incidence cannot be assessed but at least 200 cases are thought to have occurred

The eruption is follicular and of a discrete papular type with localised irritation but normally no general symptoms, except occasionally some malaise or vomiting In a very few bad cases in young children there have been moderate adenopathy and mild pyrexia. The face including the retro-auricular region is most commonly affected; next in frequency are the back, forearms, abdomen, and legs After a day or two the rash becomes less prominent, but horny plugs appear in the follicles and the skin feels like a nutmeg-grater The eruption disappears in 4–10 days. The incidence is highest in women and young children, and evidence of infectivity is still inconclusive.

Possibly similar outbreaks *may be occurring elsewhere* in the country but, owing to the mildness of the condition are escaping close attention It is hoped that practitioners and others meeting with this condition will inform the medical officer of health concerned and that the M.O.H will send the relevant facts to the Ministry of Health (S M O Med 3) Savile Row, London, W 1.

Variola Minor in Lancashire

Laboratory tests have confirmed a diagnosis of variola in a cotton worker resident at Milnrow, Lancashire The patient was unvaccinated Fever and constitutional disturbance started on Jan. 20 and the rash appeared on Feb 1 This patient was removed to a smallpox hospital on Feb 8 Her husband sickened on Feb 14 and developed a rash on Feb 17 Her daughter sickened on Feb 16 Both were removed to hospital on Feb 17

Temperatures of 102 F were recorded during the prodromal stage; thereafter the disease was mild The rash was *discrete* and sparse, but the distribution was typical of variola minor

It now seems probable that similar cases exist in the adjacent town of Rochdale

Health Services and the Family

Introducing his last report as medical officer of health for the West Riding of Yorkshire—that for the year 1950—Dr Fraser Brockington questions whether the health services are well organised to deal with the family as a biological unit Dr Brockington (who now holds the chair of social and preventive medicine in Manchester University) takes as an example the care of the aged

"The answer for the aged, he says will not be found in the devising of separate machinery however complete and ingenious this may be and certainly not by the coining of new terms however descriptive if and to the extent that a true answer can be found with which to counteract the disabilities of a fast ageing nation, and one that will enable us to extract the maximum of benefit from an occurrence so widespread as to be new to man's life on earth it will be seen in an expansion and adaptation of the health services based upon the family unit these will incorporate but not separately distinguish new forms of welfare for the aged."

Dr Brockington goes on to remark that if the family is to be treated as a living unit it must have a doctor and here the family physician should be paramount. Yet the family *doctor has lost much of his authority* At least between him and the medical officer of health there is no conflict, provided that their work is integrated and focused on the family But is it?

"One example of relative failure to synchronise our efforts is the fact that the health visitor as the modern all purpose social worker in the health field is still handling areas of streets and parishes so that her work can seldom be correlated with that of one or more general practitioners In the last analysis both the general practitioner and the health visitor are employed by the community to promote health, and these two should work in harness so that the health visitor acts as the right hand of the general practitioner

it should not be impossible now to think in terms of relating the work of our health visitors to groups of families under the care of one or more limited number of general practitioners

If we multiply the agencies which impinge on the family group we shall tend to disrupt the basic framework on which health ultimately depends.

" the problems of family life cannot be separated into watertight compartments so that Miss A can visit to deal with the problems of baby care Miss B with little Tommy who has been found at school to have some defect Miss C with the foster child Miss D with the older boy who is under the care of the mental health committee and Miss E with the aged grandfather now beginning to fail. The social problems involved in all these and other similar situations are related one to another in such a way that they can rarely be dealt with separately Our zeal for improvement in the social field may yet prove to be our own undoing A variety of such social workers carries with it a new danger to the family unit It is time to protect both the family unit from harassing contacts, and the public purse from extravagant expenditure by accepting a common basic social worker *throughout the whole field of sociomedical work.* The person most fitted for such work is the health visitor'

Dr Brockington adds that if we seek to orientate our health services once more towards the family we shall recognise the pressing need for health centres. Such centres would do much to bring about a new balance in people's minds and to restore the practitioner to his proper position

Obituary

WILLIAM JOSEPH ELFORD

Ph.D Brist., F R.S.

EARLY in the development of the work on virus diseases at the National Institute for Medical Research it became apparent that real knowledge of the properties of viruses could only be attained by the application of *physical and chemical as well as biological methods to* their study At this stage, in 1925 W J Elford was appointed to the scientific staff of the Medical Research Council to take part in work on the problem, and as time went on it was clear that no better choice could have been made Although he joined the virus workers as a young physical chemist without experience in biology he rapidly learnt to work with full appreciation of the mode of thought of his medical and biological colleagues, and he came to have a real understanding of the biological aspects of the problem so that eventually he was one of the most valuable members of the team

Elford was born in 1900 at Malmesbury in Wiltshire. He was educated at Bristol University where he graduated in 1923, later holding the Colston research fellowship and doing research in physical chemistry under Prof J W McBain F R.S On joining the staff of the Medical Research Council, Elford applied himself to the study of methods for determining the size of virus particles and it is for his work on this *very important aspect of virus* research that his name will be most remembered The well known technique that he developed was based on the discovery of methods for the preparation of collodion membranes of very uniform pore diameter and of regularly graded pore size These gradocol membranes have been used in virus research laboratories throughout the world and made it possible to acquire accurate estimates of the size of virus particles long before the modern techniques of ultracentrifugation and electron microscopy became available so far as the size of virus particles alone is concerned these later techniques have indeed done little more than confirm the validity of Elford's methods

Recently Elford made another remarkable contribution to virus research by his discovery that the previously known power of red cells to adsorb certain viruses was a property of the stromata rather than of the intact cells.

This enabled him, in conjunction with his physical colleagues, to apply electron microscopy with good effect to the study of viruses adsorbed on red-cell "ghosts"; it was experiments by this technique that revealed the unexpected fact that some recently isolated strains of influenza virus exist largely in the form of long filaments He applied a similar method to the study of the adsorption, on the "shells" of disintegrated bacteria, of bacteriophages, a group of viruses that had long attracted his interest,

Elford remained unmarried. He was a man of modest and retiring disposition, scrupulously precise in all that he did He never sought to have men working under his direction, but he set an example of single-minded devotion to duty and unflagging enthusiasm for research He was held in great affection by his scientific colleagues, whom he was always ready to help in their problems. Until restricted by ill health he also earned the gratitude of many of his fellow members of the staff of the National Institute for Medical Research by his interest and participation in their social and particularly their athletic activities—in his younger days he was himself an excellent athlete For some years he had been handicapped by indifferent health, but by his determination he reduced this handicap to a minimum, and he was engaged in active and productive research until the onset of his last illness

Elford's scientific achievement was recognised by his election to the fellowship of the Royal Society in 1950 He greatly prized this distinction which was also welcomed by all the many workers in medical research who owe so much to his contribution and who now mourn his early death

O. R H

HENRY DRYSDALE DAKIN

D Sc, LL.D Leeds, D Sc. Yale, Ph D Heidelberg,
F R.I C, F R.S

Dr H D Dakin, who died on Feb 10, at the age of 71, at his home near New York, will be remembered not only for his eponymous solution but also for his share in isolating the anti-anæmic principle of liver

Dakin was born in London, and though he spent most of his life in the United States he always kept his British nationality and attachments His father, a Leeds iron and steel merchant, articled him to the Leeds city analyst, and after serving his apprenticeship Dakin went to the Yorkshire College—now the University of Leeds—where he took the honours course in chemistry, graduating B SC in 1902 While working in the department of the late Prof J B Cohen his interest in biochemistry was aroused, and he continued his studies at Heidelberg University and the Lister Institute In 1905 Dr Christian Herter invited Dakin to join him in the private research laboratory he had installed at the top of his house in Madison Avenue, New York. When Dr Herter died five years later Dakin became director of the laboratory

On the outbreak of war in 1914, though in poor health, he came back to this country to offer his services, and he later joined Alexis Carrel's research unit at Compiègne There, in coöperation with French surgeons, he devised his stabilised hypochlorite solution for the antiseptic treatment of wounds. Later he sailed to the Dardanelles on the *Aquitania*, then a hospital ship, to supervise the use of a tank of his own devising which produced an unlimited supply of the solution by electrolysis of sea water In 1917 he was elected F R S

In 1916 he had married Mrs Susan Herter, widow of Dr Herter, and when he returned to America after the war they moved out of New York to a country house on the Hudson where Dakin was once more able to have a private laboratory There until recently he continued his researches, which, in the words of a colleague, "always had an unhurried perfection and elegance of their own" He was awarded the Davy medal of the Royal Society in 1941

A. W writes "Dakin was one of the happily inspired chemists who early in this century decided to apply to the study of biological material and processes the precise and refined methods of organic chemistry How well he and his fellow pioneers succeeded is clear to all who have studied the growth of biochemistry during the past fifty years Biochemists who have grown up in the modern era of chromatography may well reflect, with astonishment and admiration on the outstanding success by Dakin and his contemporaries in their early the isolation of amino-acids from hydrolysed

"The name of H. D Dakin has been indelibly in the annals of biochemistry and physiology, will for ever be remembered for his classical protein chemistry, the separation of amino- tissue oxidation, and for his contributions to the study of the anti-pernicious-anæmia factor Som best remember him for the antiseptic fluid or associated with his name, and others for his *and Reductions in the Animal Body*, a book the first of its kind, and which is still who possess a copy

"Despite his shyness and his dislike of the he received many honours and distinctions, remained always the most modest of men, courtesy and with a rich affection for all his was always a delight to receive a letter from him of 'a few little pushes' he had made in or relating with pleasure a talk he had had with from Britain who had called to see him. Those who the guests of H. D. and Susan Dakin at their house at Scarborough-on-Hudson, will cherish memory of the charm and happiness of their the warmth of their welcome Dakin did not long the death of his wife, and biochemistry is the for the loss of a man of outstanding ability, and infinite charm."

FRANK HUBERT ROBBINS

M.C., M.B Camb, F R.C.S E

Dr Frank Robbins died on Christmas at his home in Golders Green where he had for many years

He was born in 1887, the son of a distinguished surgeon, and was educated at St Paul's Pembroke College, Cambridge, and at St Hospital His earnest quiet manner as a student him his nickname of "Razzle" Having taken a class in the natural sciences tripos in 1909, he in 1912 from St Bartholomew's Hospital and held appointments at Barts He joined the 80th ambulance, R.A.M C, T A., in 1914 and served in F Salonika, and Gallipoli, being awarded the Cross On demobilisation he spent some time in graduate study, taking the F R.C.S.E in 1920 his M B in 1923 He practised at Leatherhead short time before taking over the late Dr Shaw's in Golders Green, where he remained until his

Dr Robbins had many outside interests Post Office surgeon, Treasury medical officer, referee to the Prudential Assurance Company, a of National Service boards, medical officer to the District Hospital, and referee to the Golders Crematorium.' One of his colleagues writes looked upon Robbins as the ideal general and a strict observer of medical etiquette in sense In committee we appreciated his sane A devout Christian and a good freemason, he was master of the Rahere Lodge. One of his sons, a medical student, died of infantile paralysis in while out with the Cambridge Climbing Club, and son was struck by the same disease, but happily Perhaps because of these sorrows he was able wise and sympathetic help to all who sought his and he will be greatly missed and long remembered patients, his colleagues, and those who loved him.

Appointments

Colonial
Birch, — .B Edin. M O, Sierra Leone
De Bono — M.O, Sierra Leone
Hanrat — M.B N U I M O Tanganyika
Hogg, R — M.O, Sarawak.
James, C — O, North Borneo
McCourt — M.O (special grade),
Robertson — Edin M.O, Tanganyika
Tatham, Pa — M O Federation of Malaya
Wertheim L — , Tanganyika

The Terms and Con — Service of Hospital M Dental Staff apply to — hospital posts we advertise, otherwise stated Canvassin — disqualifies, but candidates may visit the hospital by appo

Notes and News

49 GREAT ORMOND STREET

SOME years ago a correspondent in our columns[1] reminded ur readers that in treating children it should be borne in ind that 'they bear blood letting badly with not unfre ently fatal results much caution therefore is required, and e bleeding from leeches is difficult to check.' To our ears, tuned to catch the first whisper of the latest antibiotic, s advice may sound conservative But it is not only therapy at has changed in the care of children. A hundred ars ago London had no hospital for children. In 1850 the oyal Infirmary for Children in the Waterloo Road founded 1816 could still only take outpatients, and as THE LANCET inted out: 'with the exception of a ward at Guy's the edical student may 'walk' every hospital in London and ave no opportunity of seeing a single instance of infantile sease'[2] But one man at least was growing impatient. Charles West physician to the infirmary was seized of e need to set up a hospital where children, and only children ould be admitted as inpatients By February 1852 his ergy and persuasiveness had made it possible to open The hildren's Hospital at 49 Great Ormond Street, the house hich had once belonged to Queen Anne's physician, Richard ead.

To begin with, the hospital had 10 beds and in the first onth only 8 children were admitted, for there was a great ar of infection. But Great Ormond Street's high standard of ygiene and nursing was born with the hospital, and the roblem of finding patients for the beds soon changed to the ore usual one—which still persists—of finding beds for he patients. From the beginning the hospital has had distinuished and able backers. Lord Shaftesbury was its first esident, and Charles Dickens presided over an early festival inner At Queen Victoria's golden jubilee the children of he Empire themselves provided money to build a new wing hich brought the number of beds to 240 In 1908 Lord Astor uilt a new outpatient department And so it has gone on. r James Barrie Lord Southwood, Lord Nuffield and the eople of South Africa are others who have contributed enerously to the past or the future of the hospital. A country ranch was opened at Tadworth in 1927 and in 1938 King eorge VI opened the present modern hospital with over 00 beds. Plans for the new Institute of Child Health, a ew outpatient department, a model child welfare centre and school treatment centre await the future, for Great Ormond treet expects to do as much in its next century as it has done n its first.

ANNALS OF PHYSICAL MEDICINE

MEDICINE, like the universe is constantly expanding f only we had constantly expanding doctors to accommodate , things would be easier As it is we have to split it into pecialties each of which at once begins to expand on its own ccount

During this century what we used to call physiotherapy has been particularly expansive, and in an editorial in the first issue of the *Annals of Physical Medicine* Dr Hugh Burt reminds us that the scope of this renamed specialty now includes physical reablement and resettlement as well as the use of physical agents in diagnosis and treatment Twenty five years ago there were in the leading hospitals a handful of physiotherapy departments; treatment in them was passive palliative and largely empirical. Most of the patients attending had locomotor disorders for which nobody lse in the hospital had been able to do anything much. "It was a sign of the times" the Editor remarks "that a patient when asked what was wrong with him replied Radiant heat to the back for twelve years." But times were changing; in 1931 the physical medicine group of the British Medical Association was established; in 1932 the ections of balneology and electrotherapy of the Royal Society of Medicine fused to form the physical medicine section; and 1943 saw the founding of the British Association of Physical Medicine In the same year the first examination for the diploma of physical medicine was held

The new journal the organ of the association, is to appear as a quarterly It is in the formal pattern of other annals, and graced with a red cover as warming as a radiant heat lamp Two substantial and informative articles open it—one by A. C Boyle H. E Cook, and D. L. Woolf of the Middlesex Hospital on investigations into the effects of micro waves and one by I H M. Curwen and B O Scott, of St Thomas's Hospital on the treatment of complications of varicose veins. Notes, news, and abstracts of published work follow There are Dr Burt reminds his readers, vast fields for clinical and technical research in physical medicine, and the official journal of the association is the proper place in which to record the results. Lord Horder who took a large part in founding the association appropriately appears in portrait on the frontispiece and in a friendly foreword welcomes and introduces the *Annals*

The Editor should be addressed at 45 Lincoln's Inn Fields, London W C 2 and the publishers (Messrs. Headley Brothers) at 109 Kingsway W C.2 The annual subscription is £1 1s

TEACHING OF PREVENTIVE MEDICINE

A NEW series of film strips designed primarily for student teachers includes two that are of particular interest to medical and nursing schools The first is on the school health service and illustrates the different aspects of the work—inspection, treatment control of communicable diseases, special forms of education and health education—with the functions of nurse teacher and doctor The diagrammatic organisation charts are particularly clear The second film-strip is devoted to the education of handicapped children and provides a clear record of existing practice These two strips clearly show the value of visual aids in liberating the lecturer from a mass of description and enabling him to develop those points in which his particular audience is interested. The medical adviser for both strips was Dr Denis Pirrie principal medical officer London County Council; and they can be obtained with teaching notes from Kay's Carlton Hill Film Studios 72A Carlton Hill London, N W 8, for 15s 6d each or 30s for the two

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University of Cambridge

On Feb 8 the following degrees were conferred:

M D—John Lister, A A Miles J. R Robinson H T H Wilson
M.B B Chir—N R Lewis D B Murray E. M Sproston.
By proxy

Royal College of Surgeons of England

At a meeting of the council held on Feb 14 with Sir Cecil Wakeley the president, in the chair Mr R J McNeill Love and Prof Digby Chamberlain were re-elected, and Mr C W Fleming was elected to the court of examiners. The Hallett prize was awarded to J C N Wakeley of King's College Hospital A Moynihan lectureship was awarded to Dr L Mayer of New York The award of Prophit research studentships to Mr F Masina and Mr T R. Munro was reported

Diplomas of membership and diplomas in public health were granted to those named in our report of the comitia of the Royal College of Physicians (*Lancet* Feb 9 1952 p 322) Diplomas of membership were also granted to D W Ebrahim and B G Jackson, and a diploma in tropical medicine and hygiene to M. Lwin.

Sir James Learmonth regius professor of clinical surgery in the University of Edinburgh, will deliver the Lister oration at the college at 5 P.M on April 4 The title of the oration is After Fifty six Years. All medical practitioners are eligible to attend.

Hunterian Memorial Service—On Feb 14 Sir Henry Dale O.M., F.R.S., unveiled a tablet at St Martin in the Fields to commemorate the fact that John Hunter's remains rested there till they were transferred to Westminster Abbey in 1859 Speaking at the service Sir Gordon Gordon Taylor described how Hunter's remains were traced by Frank Buckland then an assistant surgeon in the Life Guards and later an ichthyologist With these two names Sir Gordon associated that of George Grey Turner another great collector and fervent believer in the value of the museum who had first suggested that the commemorative plaque should be set up

Society of Endocrinology

At a meeting of this society to be held on Monday March 24 at 5.30 P.M. at 1 Wimpole Street London W 1 Dr Dwight Ingle will speak on the Rôle of the Adrenal Cortex in Homœostasis.

International Congress on Analytical Chemistry

This congress will meet at Oxford from Sept. 4 to 9 under the presidency of Sir Robert Robinson, O.M F.R.S The hon. secretary is Mr R. C Chirnside F.R.I.C Research Laboratories, General Electric Co; Wembley

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1. Williams, E *Lancet* 1851 ii 505
2. *Ibid*, 1850 i 601.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Feb 5, with Dr W A Alexander, the president, in the chair, the following were elected to the fellowship

C M Fleming M D Glasg , Walter Henderson M D Edin , H E Seiler, M D Glasg , I H L Gillies, M D Glasg , W H Galloway, M B Edin

The following were elected to the membership

William Boyd Irene P Rowlands, Sidney Stein, Robert Orton J N Armour G W Reid, V D Bayliss Suraj Prakash H M Forde Nathan Gordon, Rajeshwar Prasad Balawant Mahadeo Kher, Leon Albert, John Gant Mahadeo Prasad Mehrotra Jean C Taylor, Harry Black, A C Douglas P C MacGillivray Mohomed Ahmed Botawala Suresh Dhirajlal Store, R S M D Inch

Society of Medical Officers of Health Services Group

The annual dinner of this group will be held at 7.30 P M on Friday, March 14, at Simpsons in the Strand Any past or present serving officer will be welcome Tickets (25*s*) may be had from Dr G M Frizelle, London School of Hygiene and Tropical Medicine, Keppel Street, W C 1

Bed-patients Moved by Trailer

At the Rowley Bristow Orthopædic Hospital, Pyrford, near Woking, patients confined to bed are now taken to the various departments by a 'Pyrford' trailer This fits under the bed, which is then jacked up by hydraulic pressure The trailer and bed are drawn by a Tomlinson pedestrian controlled vehicle, powered by batteries

Exhibition of Medical Illustration

The medical group of the Royal Photographic Society and the Medical Artists' Association of Great Britain is holding an exhibition of photography and art in medicine from June 13 to 28 at the British Medical Association House, Tavistock Square, London, W C 1

EMERGENCY BED SERVICE —In the week ended last Monday applications for general acute cases numbered 1195 The proportion admitted was 87 5%

ADDENDUM *Hospital Prayers* —Those who wish to take advantage of the offer of Nottingham General Hospital to supply copies of *A Collection of Prayers for Use in Hospitals* (see *Lancet*, Feb 16, p 375) should send their orders, with the cost of packing and postage, to the printers, Messrs Derry & Sons, Ltd , Nottingham

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Brigadier R R G Atkins, O B E , M C , late R A M C has been appointed commander of the Order of Leopold II of Belgium, and Lieut. Colonel John Smith, O B.E , R A M C , officer of the Order of Leopold The Croix Militaire (first-class) has been awarded to Lieut. Colonel J V Bradley, R.A M C , and Major J K Willson Pepper R A M.C

Births, Marriages, and Deaths

BIRTHS

BROWN —On Feb 8, the wife of Dr J A W Brown, of Chesterton, Stoke on Trent—a daughter

DU HEAUME —On Feb 7, at Enfield, the wife of Dr Brian Du Heaume—a son

LEVY —On Feb 13, the wife of Dr Basil Levy, of Liverpool—a son

O MALLEY —On Jan 23 at Dar es Salaam, the wife of Lieut. colonel A H O Malley, I M.S retd—a daughter

SHAW —On Feb 14 at Bristol, the wife of Dr Stuart Shaw—a son

TOMLINSON —On Feb 9, the wife of Dr A J H Tomlinson, of Shipley Yorks—a daughter

MARRIAGES

GRAY—WHITESIDE.—On Feb 12, in *Glasgow*, the Rev John R Gray, B D to Sheila Whiteside, M B

HOLLAND—CONSTABLE —On Feb 13 in London, Sir Eardley Holland F R.C P , F R C O G , to Olivia Constable

MORRIS—PRIDHAM —On Jan 12 at Broadway Dorset, G C R Morris B M to M R. D Pridham

STEWART—KEMSLEY —On Feb 9 at Oxford, Henry Stewart, to Margaret Kemsley, M B

DEATHS

AINSWORTH —On Feb 13, Hugh Ainsworth, M B Manc , F R C S , colonel I M S retd

EAMES —On Feb 15 at Shrewsbury John Ward Eames M B Leeds, colonel A M S

MORCOM —On Feb 12 in [illegible] Farr Morcom, M R C S, [illegible]

Diary of the Week

FEB 24 TO MARCH 1

Sunday, 24th

LONDON JEWISH HOSPITAL MEDICAL SOCIETY
3 P M (Woburn House, Upper Woburn Place, W C 1) J M Robson Chemotherapy of Tuberculosis

Monday, 25th

UNIVERSITY OF LONDON
5 P M (University College Gower Street, W C 1) Prof van Dyke (Columbia University) Antidiuretic of Blood and Urine in Relation to Neurohypop Secretion

HUNTERIAN SOCIETY
8 30 P M (Mansion House, E C 3) Dr George Day (Hunterian oration)

INSTITUTE OF PSYCHIATRY Maudsley Hospital, Denmark S E 5
5 30 P M. Dr E Stengel Lecture-demonstration

MANCHESTER MEDICAL SOCIETY
9 P M (University of Manchester) *Section of General Pr* Dr Marc Daniels Tuberculosis and the G Practitioner

UNIVERSITY OF EDINBURGH
5 P.M (University New Buildings, Teviot Place Edinb Prof Marc Klein (Strasbourg) Steroid Hormone Behaviour

Tuesday, 26th

UNIVERSITY OF LONDON
5 30 P M (Westminster Medical School, Horseferry Road, S Prof R Milnes Walker Pathology and Treatme Portal Hypertension

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W C 2
5 P M Mr H H Stewart Partial Nephrectomy in the ment of Renal Calculi (Hunterian lecture)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene Keppel Street, W Prof E C Dodds, F R.S Research on Ageing

INSTITUTE OF DERMATOLOGY St John's Hospital, Lisle W C 2
5 30 P M Dr R G Cochrane Leprosy

WEST END HOSPITAL FOR NERVOUS DISEASES, 40, Maryl Lane W 1
5 30 P M Dr C Worster Drought Neurology demonstra

UNIVERSITY OF EDINBURGH
5 P M (University New Buildings) Prof Tadeus Reic (Basle) Chemistry of Adrenal Cortical Horm (Cameron lecture)

Wednesday, 27th

INSTITUTE OF DERMATOLOGY
5 30 P M Dr Cochrane Histopathology of Leprosy

MEDICAL SOCIETY OF LONDON, 11, Chandos Street W 1
8 30 P M Mr R C Brock Surgery of the Heart and Vessels (Second of three Lettsomian lectures)

Thursday, 28th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 30 P M (London School of Hygiene) Prof M L Lability of Blood pressure

INSTITUTE OF CHILD HEALTH, Hospital for Sick Children Ormond Street W C 1
5 P M Mr D N Matthews Plastic Surgery

ST GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park S W 1
4 30 P M Dr Desmond Curran Psychiatry demonstration.

ST JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, Lisle W C 2
4 15 P M Clinical demonstration
5 P M Dr Cochrane Leprosy

Friday, 29th

ROYAL INSTITUTION, 21 Albermarle Street W 1
9 P M. Sir Henry Cohen The Brain as a Machine

UNIVERSITY COLLEGE
5 30 P M Prof J F Danielli, D.SC Cell Physiology Pharmacology

INSTITUTE OF DERMATOLOGY
5 30 P M Dr Cochrane Clinical demonstration—Lepros

INSTITUTE OF DISEASES OF THE CHEST AND INSTITUT CARDIOLOGY
5 30 P M (London School of Hygiene) Sir Clement Thomas Surgical Treatment of Patent Ductus Arte and Coarctation

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES
7 30 P M (11, Chandos Street W 1) Dr F R Curtis Value of G F T

Messrs Ernest Benn Ltd inform us that they have pub under the title of *The Crowd* an English translation of *Psy des foules* by Gustave Le Bon lately mentioned in our (Feb 9, p 300)